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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(60) Parent Application or Grant UNITED VIDEO PROPERTIES, INC. [/]; O. HASSEL, Joel, G. [/]; O. THOMAS, William, L. [/]; O. ELLIS, Michael, D. [/]; O. TREYZ, G., Victor ; O.		
(54) Title: INTERACTIVE PROGRAM GUIDE WITH CONTINUOUS DATA STREAM AND CLIENT-SERVER DATA SUPPLEMENTATION (54) Titre: GUIDE DE PROGRAMME INTERACTIF AVEC FLUX D'INFORMATIONS CONTINU COMPLEMENT D'INFORMATIONS CLIENTS-SERVEURS		
(57) Abstract  An interactive television program guide system is provided. An interactive television program guide implemented on user television equipment obtains program guide data from two data delivery mechanisms. Current program guide data is obtained from a continuous data stream. Other program data (which may include the current program guide data) is obtained by the program guide from a program guide server. The continuous data stream may also include program and program grouping identifiers. The program guide may perform real-time actions associated with program identified in the continuous data stream.		
(57) Abrégé  L'invention concerne un système de guide de programme de télévision interactive. Un guide de programme de télévision interactif mis en oeuvre sur un équipement de télévision pour usager reçoit des informations de guide de programme à partir de deux mécanismes fournisseurs d'informations. Les données pour guide de programme courant sont obtenues à partir d'un flux d'informations continu. D'autres informations pour guide de programme (pouvant inclure les informations pour guide de programme courant) sont obtenues par le guide de programme à partir d'un serveur des guides de programme. Le flux d'informations continu peut également comprendre des identificateurs de programmes et des identificateurs de groupement de programmes. Le guide de programme peut effectuer des actions en temps réel associées aux programmes identifiés dans le flux d'informations continu.		

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(71) Applicant: UNITED VIDEO PROPERTIES, INC. [US/US]; 7140 South Lewis Avenue, Tulsa, OK 74136 (US).			
(72) Inventors: HASSEL, Joel, G.; 8246 Yarrow Court, Arvada, CO 80005 (US). THOMAS, William, L.; 11611 South 70th East Avenue, Bixby, OK 74008 (US). ELLIS, Michael, D.; 1300 Kingwood Place, Boulder, CO 80304 (US).			
(74) Agents: TREYZ, G., Victor et al.; Fish & Neave, 1251 Avenue of the Americas, New York, NY 10020 (US).			
(54) Title: INTERACTIVE PROGRAM GUIDE WITH CONTINUOUS DATA STREAM AND CLIENT-SERVER DATA SUPPLEMENTATION			
(57) Abstract			
<p>An interactive television program guide system is provided. An interactive television program guide implemented on user television equipment obtains program guide data from two data delivery mechanisms. Current program guide data is obtained from a continuous data stream. Other program data (which may include the current program guide data) is obtained by the program guide from a program guide server. The continuous data stream may also include program and program grouping identifiers. The program guide may perform real-time actions associated with program identified in the continuous data stream.</p>			

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INTERACTIVE PROGRAM GUIDE WITH CONTINUOUS DATA STREAM  
AND CLIENT-SERVER DATA SUPPLEMENTATION

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Background of the Invention

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5 This invention relates to interactive television program guide systems, and more particularly, to interactive television program guide systems in which an interactive television program guide obtains program guide data using two data delivery mechanisms.

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10 Cable, satellite, and broadcast television systems provide viewers with a large number of television channels. Users have traditionally consulted printed television program schedules to determine the programs being broadcast at a particular time. More recently, interactive television program guides have been developed that allow television program information to be displayed on a user's television. Interactive television program guides, 15 which are typically implemented on set-top boxes, allow the user to navigate through television program

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10                   listings using a remote control. In a typical program  
                  guide, various groups of television program listings  
                  are displayed in predefined or user-selected  
                  categories. Program listings are typically displayed  
5                    in a grid or table.

15                   How program listings data is delivered to the  
                  program guide may impact overall system performance and  
                  the amount of hardware needed at the user's home. One  
                  known data delivery approach involves providing a

20                   10 continuous "trickle" data stream of program guide data  
                  to the set-top boxes of a number of users, typically on  
                  an out-of-band channel. The program guide stores a  
                  local copy of the program guide data provided in the  
                  continuous data stream. This approach has a number of  
25                   15 advantages. Maintaining a local copy of the program  
                  guide data at the set-top box allows the program guide  
                  to function even if the program guide does not have  
                  access to the data stream for an extended period of  
                  time. Program guide data is also available to the  
30                   20 program guide with no latency. In addition, multiple  
                  local data feeds are unnecessary because the program  
                  guide can filter its local channel lineup from a single  
                  national data feed.

35                   However, this approach requires a significant  
40                   25 amount of memory in the set-top box. If an in-band  
                  data channel is used, the guide must tune to a channel  
                  carrying the data at a regular interval, possibly  
                  preventing the user from watching television during  
45                   45 that time. If an out-of-band channel is used, a  
                  30 significant amount of time may be required to initially  
                  populate the database of program guide data maintained  
                  in the set-top box.

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10 In a known Digital Satellite Services (DSS) system, multiple high-speed feeds of various subsets of program guide data are provided to the program guide. This approach suffers from a number of deficiencies. A  
15 5 significant amount of local memory is required to store the data in the satellite receiver, and the program guide or the satellite receiver must still discard some data when the program guide needs to acquire additional data from one of the feeds. There is a delay when the  
20 10 program guide tunes to and acquires such additional data from a particular feed. The high-speed feeds may also not be formatted to allow all types of searches and sorts on the data.

25 Another type of satellite system has been  
30 15 proposed in which a combination of a trickle feed and high-speed feeds is used to provide program guide data to the program guide. This approach also requires a significant amount of local memory for storing the program guide data. The system also incurs a delay  
35 20 when the program guide acquires data from different streams.

40 In a client-server based approach, all of the program guide data may be stored on a remote server that handles program guide data requests from a number  
45 25 of program guides (clients). This approach allows complex requests to be handled with a powerful server rather than a cost-sensitive client device. However, there may be delays associated with accessing the server, especially during times of peak usage. This  
50 30 may result in delays in fundamental operations, such as channel changing. Also, because no data is stored locally by the program guide, the program guide becomes

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10 non-functional if the connection to the server is  
broken.

15 It is therefore an object of the present invention to provide an interactive television program 5 guide system in which the program guide may obtain program guide data using multiple data delivery mechanisms and thereby provide a robust system in which the amount of memory required for the user's home 20 program guide equipment and the latency for accessing 10 program guide data are minimized.

Summary of the Invention

25 This and other objects of the present invention are accomplished in accordance with the principles of the present invention by providing an 15 interactive television program guide system in which program guide data is obtained by an interactive 30 program guide from a continuous stream of program guide data and from a program guide server.

35 A main facility provides program guide data 20 to a television distribution facility. The television distribution facility provides some of the program 40 guide data (e.g., current program listings data which may include data for program listings for the current time slot and for the next few hours) over a continuous 45 25 data stream to a number of program guides. Each program guide is implemented on user television equipment associated with a user. The television distribution facility also stores program guide data in a program guide server and provides the stored program 30 35 guide data to the program guides using a client-server arrangement.

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10                         The television distribution facilities may  
also transmit program and program grouping identifiers  
(e.g., identifiers for series, mini-series, orderable  
packages of programs, etc.) in the continuous data  
15                         stream. The program guides may perform real-time  
actions associated with programs identified in the  
continuous data stream.

20                         This approach has a number of advantages over  
other known systems. For example, the cost of the  
25                         10 user's television equipment may be reduced because the  
memory requirements of the television equipment are  
minimized. In addition, current data which is needed  
frequently is available more quickly because a  
connection to a remote server need not be established  
30                         15 before the data is obtained, as is required with a pure  
client-server approach. By sending frequently-used  
data in a broadcast stream, the total number of  
required network connections and the total amount of  
data to be transferred may be reduced. This may  
35                         20 significantly reduce the total network load associated  
with the television distribution facility.

40                         The program guide server may perform  
complicated searches and sorts. This may reduce the  
computational demands placed on the user television  
45                         25 equipment and may relieve the user television equipment  
of the burden of performing database management tasks.  
In addition, by delivering program guide data using two  
separate data delivery mechanisms, a robust system may  
be provided in which some program guide data may still  
50                         30 be obtained by the program guide even if the  
communications line used by one of the delivery  
mechanisms is interrupted.

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Further features of the invention, its nature and various advantages will be more apparent from the accompanying drawings and the following detailed description of the preferred embodiments.

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5 Brief Description of the Drawings

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FIG. 1 is a schematic block diagram of an illustrative system in accordance with the principles of the present invention.

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FIG. 2 is a schematic block diagram of 10 illustrative user television equipment in accordance with the principles of the present invention.

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FIG. 3 is a generalized schematic block diagram of portions of the illustrative user television equipment of FIG. 2.

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FIG. 4 shows an illustrative main menu screen in which selectable program guide options are displayed for the user.

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FIGS. 5a and 5b show illustrative display screens in which program listings are displayed by time 20 and by channel, respectively.

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FIG. 6 shows an illustrative additional program information screen.

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FIG. 7 shows an illustrative program listings by category screen in which program listings are 25 displayed for a particular category.

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FIG. 8a shows an illustrative FLIP display that may be displayed when the user changes channels.

FIG. 8b shows an illustrative BROWSE display that may be displayed when the user indicates a desire 30 to browse through program listings for a given time slot.

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10 FIGS. 9a and 9b show illustrative reminder set-up and confirmation overlays, respectively.

15 FIGS. 10a and 10b show illustrative reminder lists.

5 FIG. 11a shows an illustrative pay-per-view program listings display screen.

15 FIG. 11b shows an illustrative pay-per-view ordering overlay.

20 FIG. 11c shows an illustrative pay-per-view 10 order confirmation overlay.

25 FIG. 11d shows an illustrative overlay in which the program guide indicates to the user that a particular pay-per-view program has been ordered and provides the user with the opportunity to cancel the 15 duplicate order.

30 FIG. 11e shows an illustrative overlay in which the program guide indicates to a user that a particular pay-per-view program has started and provides the user with the opportunity to order it 20 anyway.

35 FIGS. 12a and 12b show illustrative display screens in which the program guide indicates to the user that an ordered pay-per-view program is starting.

40 FIGS. 13a and 13b show illustrative windows 25 in which the program guide indicates to the user that the user has missed an ordered pay-per-view program.

45 FIGS. 14a and 14b show illustrative overlays 30 that may be displayed by the program guide to provide a user with the opportunity to confirm the recording of a program.

50 FIGS. 15a and 15b show illustrative parental control overlays that the program guide may display

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10 when a user indicates a desire to lock a program or access a locked program, respectively.

15 FIG. 16 is an illustrative flowchart of steps involved in obtaining program guide data with the 5 program guide from two data delivery mechanisms in accordance with the principles of the present invention.

20 FIG. 17 is an illustrative flowchart of steps involved in providing a user with program listings data 10 and additional program information using the program guide in accordance with the principles of the present invention.

25 FIG. 18 is an illustrative flowchart of steps involved in performing real-time actions associated 15 with a showing of a program in accordance with the principles of the present invention.

30 FIGS. 19a-19c show illustrative data flow diagrams of three embodiments of the interactive 20 program guide system of the present invention in which 35 the program guide performs real-time actions based on identifiers transmitted in a continuous data stream.

Detailed Description of the Preferred Embodiments

40 An illustrative interactive television 45 program guide system 10 in accordance with the present 25 invention is shown in FIG. 1. Main facility 12 provides program guide data from program guide data source 14 to television distribution facility 16 via 30 communications link 18. There are preferably numerous 50 television distribution facilities 16, although only one such facility is shown in FIG. 1 to avoid over-complicating the drawing. The program guide data transmitted by main facility 12 to television

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10 distribution facility 16 may include television program  
listings data (e.g., program times, channels, titles,  
and descriptions) and other program guide data for  
additional services other than television program  
15 5 listings (e.g., additional program information, pay-  
per-view ordering information, weather information,  
news information, associated Internet web links,  
advertisement graphics, videos, etc.). The program  
guide data may also include unique identifiers for each  
20 10 showing of each program, identifiers for program  
groupings (e.g., series, mini-series, orderable  
packages of programs, etc.), or any other suitable  
identifier.

25 Link 18 may be a satellite link, a telephone  
15 network link, a cable or fiber optic link, a microwave  
link, an Internet link, a combination of such links, or  
any other suitable communications link. If it is  
30 desired to transmit video signals over link 18 in  
addition to data signals, a relatively high bandwidth  
20 link such as a satellite link may generally be  
preferred to a relatively low bandwidth link such as a  
35 telephone line. Television distribution facility 16  
may be any suitable distribution facility (e.g., a  
cable system headend, a broadcast distribution  
40 facility, a satellite television distribution facility,  
or any other suitable type of television distribution  
facility). Television distribution facility 16 may  
distribute the program guide data that it receives from  
45 main facility 12 to multiple users over communications  
30 paths 20 using distribution equipment 21.

50 Distribution equipment 21 may be any  
combination of hardware and software suitable for  
distributing program guide data to user television

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10 equipment 22. Distribution equipment 21 may include, for example, suitable transmission hardware for distributing program guide data on a television channel sideband, in the vertical blanking interval of a  
15 5 television channel, using an in-band digital channel, using an out-of-band digital signal, or by any other suitable data transmission technique. Video signals (e.g., television programming) may also be provided by distribution equipment 21 to user television equipment  
20 10 22 over communications paths 20 on multiple television channels.

25 Communications paths 20 may be any communications paths suitable for distributing program guide data in a continuous data stream and using a  
15 15 client-server approach. Communications paths 20 may include, for example, a satellite link, a telephone network link, a cable or fiber optic link, a microwave link, an Internet link, a data-over-cable service interface specification (DOCSIS) link, a combination of 20 such links, or any other suitable communications link.

35 Television distribution facility 16 may have program guide server 25. Program guide server 25 may be based on any suitable combination of server software and hardware. Program guide server 25 may retrieve  
40 25 program guide data from storage device 56 in response to program guide data requests generated by interactive television program guides implemented on user television equipment 22. As shown in FIG. 1, program guide server 25 may include processing circuitry 54 and  
45 30 storage device 56. Processing circuitry 54 may include any suitable processor, such as a microprocessor or group of microprocessors, and other processing circuitry such as caching circuitry, direct memory

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10 access (DMA) circuitry, input/output (I/O) circuitry, etc. Storage device 56 may be a memory or other storage device, such as random access memory (RAM), read only memory (ROM), flash memory, a hard disk  
15 5 drive, etc., that is suitable for storing the program guide data transmitted to television distribution facility 16 by main facility 12. Program guide data may be stored on storage device 56 in any suitable format (e.g., a Structured Query language (SQL)  
20 10 database).

Processing circuitry 54 may process requests for program guide data by searching the program guide data stored on storage device 56 for the requested data, retrieving the data, and providing the retrieved  
25 15 data to distribution equipment 21 for distribution to user television equipment 22. Alternatively, program guide server 25 may transmit program guide data to user television equipment 22 directly. If communications paths 20 include an Internet link, DOCSIS link, or  
30 20 other high speed computer network link (e.g., 10BaseT, 100BaseT, 10BaseF, T1, T3, etc.), for example, processing circuitry 54 may include circuitry suitable for transmitting program guide data and receiving program guide data requests over such a link.

40 25 Program guide server 25 may communicate with user television equipment 22 using any suitable communications protocol. For example, program guide server 25 may use a communications protocol stack that includes transmission control protocol (TCP) and  
45 30 Internet protocol (IP) layers, sequenced packet exchange (SPX) and internetwork packet exchange (IPX) layers, or any other suitable layer or combination of layers. User television equipment 22 may also include

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10 suitable hardware for communicating with program guide server 25 over communications paths 20 (e.g., Ethernet cards, modems (digital, analog, or cable), etc.)

## The program guide on user television

15                 5 equipment 22 may retrieve program guide data from  
program guide server 25 using any suitable client-  
server based approach. The program guide may, for  
example, pass SQL requests as messages to program guide  
server 25. In another suitable approach, the program  
20                 10 guide may invoke remote procedures that reside on  
program guide server 25 using one or more remote  
procedure calls. Program guide server 25 may execute  
SQL statements for such invoked remote procedures. In  
25                 15 still another suitable approach, client objects  
executed by the program guide may communicate with  
server objects executed by program guide server 25  
using, for example, an object request broker (ORB).  
30                 This may involve using, for example, Microsoft's  
Distributed Component Object Model (DCOM) approach.

35 20 Program guide server 25 may also store  
program videos, video clips, or audio clips on storage  
device 56. The videos or clips may be distributed to  
user television equipment 22 using any suitable video-  
on-demand ("VOD") or near-video-on-demand ("NVOD")

40           25 approach. Program guide server 25 may, for example,  
              receive video requests from user television equipment  
              22 over communications paths 20, retrieve the requested  
              videos from storage device 56 and pass the retrieved  
              videos to distribution equipment 21 for distribution to  
45           30 user television equipment 22. Program guide server 25  
              may, for example, store videos as Moving Pictures  
              Experts Group (MPEG) MPEG-2 files on storage device 56.  
50           Processing circuitry 54 of program guide server 25 may

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10 include, for example, circuitry suitable for converting the stored MPEG-2 files into National Television Standards Committee (NTSC) video for distribution by distribution equipment 21.

15 5 In another suitable approach, program guide server 25 may transmit the videos directly to user television equipment 22 over communications path 20 as, for example, an MPEG data stream. In this approach, user television equipment 22 may include, for example, 20 suitable hardware and software for receiving and decoding the MPEG data stream and displaying the videos for the user.

25 25 Television distribution facility 16 may have multiple program guide servers 25 but only one program 15 guide server 25 has been drawn to avoid over-complicating the drawing. If television distribution facility 16 has multiple program guide servers 25, each 30 of the program guide servers may be assigned a different group of users and process that group's 20 requests for program guide data. Alternatively, 35 different program guide servers 25 may be responsible for processing requests for different types of program guide data for all users. One program guide server 25 may, for example, process requests for program listings 40 25 information and another may process requests for videos. In still another suitable approach, multiple program guide servers 25 may share the burden of 45 processing requests using a suitable dynamic load sharing approach.

50 30 If desired, some of the program guide servers 25 associated with a particular television distribution facility may be deployed at various network nodes within the distribution network (depicted

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10 as communications paths 20) for that television distribution facility. Program guide servers 25 may also be Web or other types of Internet servers located outside of television distribution facility 16. To  
15 5 simplify the present discussion, such servers may be treated as though they are located at television distribution facility 16.

20 Television distribution facility 16 may also have continuous data stream processor 71. Continuous  
25 10 data stream processor 71 may be based on any combination of software and hardware suitable for selecting a portion of the program guide data provided by main facility 12 for inclusion in a continuous data stream transmitted to user television equipment 22.  
30 15 Continuous data stream processor 71 has been shown as separate from program guide server 25, but the two systems may be combined if desired.

35 Continuous data stream processor may, for example, have processing circuitry 73 and optional  
40 20 storage device 75. Processing circuitry 73 may include any suitable processor, such as a microprocessor or group of microprocessors, and other processing circuitry such as cashing circuitry, direct memory access (DMA) circuitry, input/output (I/O) circuitry,  
45 25 etc. Optional storage device 75 may be a memory or other storage device, such as a random access memory (RAM), read only memory (ROM), flash memory, a hard disk drive, etc., that is suitable for storing program guide data.

50 30 Continuous data stream processor 71 may obtain program guide data for the continuous data stream using any suitable approach. Main facility 12 may, for example, periodically transmit program guide

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10 data for the continuous data stream to television distribution facility 16 where it may be stored by continuous data stream processor 71. Alternatively, program guide data may be transmitted continuously by  
15 5 main facility 12 to television distribution facility 16 and distributed by continuous data stream processor 71. The data may be received by television distribution facility 16 and provided to continuous data stream processor 71 or, the data may be received directly by  
20 10 continuous data stream processor 71 without passing through television distribution facility 16 (e.g., when continuous data stream processor 71 is not located in television distribution facility 16). Alternatively,  
25 program guide server 25 may store program guide data on  
15 storage device 56 and provide program guide data to continuous data stream processor 71. Program guide server 25 may provide program guide data to continuous data stream processor 71 continuously, periodically, in response to requests from continuous data stream  
30 20 processor 71, using a polling scheme, or using any other suitable approach.

35 If necessary, continuous data stream processor 71 or program guide server 25 may localize the program guide data received from main facility 12.  
40 25 Localization of the program guide data is accomplished by extracting program guide data for channels and services that are provided by a particular television distribution facility 16 and discarding the rest of the data. Localization may also involve making local  
45 30 changes to the data (e.g., changing channel names to local channel names). Continuous data stream processor 71 or program guide server 25 may store all of the

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10 received data or only data that is required locally  
(e.g., the extracted data).

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Alternatively, continuous data stream processor 71 may continuously filter program guide data 5 that is not of interest locally out of a continuous data stream provided by main facility 12. Continuous data stream processor 71 may also, for example, prioritize program guide data by assigning the frequency with which different types of program guide

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10 data will be cycled in the continuous data stream.

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After continuous data stream processor 71 obtains program guide data for the continuous data stream (e.g., from main facility 12 or program guide server 25), and assigns priorities to the different types of 15 data, it passes the data to program guide distribution equipment 21 for distribution. Distribution equipment 21 may, for example, modulate the data onto an out-of-band channel in cycles according to the assigned priorities.

30

20 The interactive program guide obtains program guide data in two different ways. First, program guide

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data is retrieved by the program guide from the continuous data stream of program guide data that is transmitted by television distribution facility 16 to

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25 user television equipment 22 over communications path 20. In order to reduce the total bandwidth required by the continuous data stream, the program

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guide data transmitted as part of the continuous data stream is limited to the subset of the program guide

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30 data selected by continuous data stream processor 71. In particular, the subset of program guide data may be current program guide data (i.e., data related to programs that are currently being broadcast or that are

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10 scheduled to be broadcast in the next few hours). The continuous data stream may include, for example, the channel number or other unique identifier for each channel, the call letters of each channel, the start  
15 5 and end time and data for the current program on each channel, the start and end time and data for the next few upcoming programs on each channel, current and upcoming program titles, current and upcoming program ratings, current and upcoming program categories, a  
20 10 unique identification number related to the specific showing of a specific program, or any suitable combination thereof.

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10 the program guide need not maintain a local database of  
data from the continuous data stream.

15 If desired, hardware filtering circuitry may  
be provided in user television equipment 22. This

5 allows hardware filtering to be used to ease the  
processing burden imposed on the program guide.

15 Program guide data for each channel may be transmitted  
in the continuous data stream and tagged, for example,  
with a channel identifier. Channel-by-channel, the  
20 10 program guide may load a filter register in the user  
television equipment with the ID of a channel of  
interest, so that the user television equipment may  
filter out the data for all other channels from the  
25 continuous data stream.

30 15 The program guide may prefetch data from the  
continuous data stream to minimize data access latency  
and thereby allow program guide data to be cycled less  
often. The program guide may prefetch data based on  
predictions of what data a user is likely to need, and  
35 20 when performing any function that accesses the  
continuous data stream. For example, if a user is  
browsing through program listings, the program guide  
may prefetch listings from the continuous data stream  
for the next time slot in the browse. Program listings  
40 25 and other information may, for example, be prefetched  
for a higher or lower channel when the user flips  
channels. If the program guide provides the user with  
the ability to tune to the last channel, the program  
45 30 guide may prefetch or cache already retrieved  
information for the most recently tuned channel. If,  
for example, the program guide provides the user with  
the opportunity to tune to favorite channels, the  
50 program guide may prefetch data from the continuous

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10 data stream for the next and the previous favorite  
channels. In still another suitable approach, the  
program guide may prefetch program guide data as a user  
enters a channel number on, for example, remote control  
15 5 40. For example, when a user enters a "2", the program  
guide may prefetch data for channels 2, 20-29, 200-299,  
etc. When a user enters the next digit, for example, a  
"3", the program guide may prefetch the data for  
20 channels 23, 230-239, etc. This list of approaches is  
10 only illustrative. Prefetching may be performed by the  
program guide for any function that requires data from  
the continuous data stream.

25 Different types of data in the continuous  
data stream may be sent at different rates (e.g., based  
15 on priorities assigned by continuous data stream  
processor 71). For example, call letters and the data  
related to the current program may be repeated twice  
30 each second or faster, while the data related to the  
upcoming program may be sent on the order of once each  
20 second. These repetition rates are merely  
35 illustrative. If desired, other repetition rates may  
be used. For example, data relating to the current  
program may be provided at a rate greater than twice  
per second (such as ten times per second).

40 25 Distribution equipment 21 preferably  
distributes the continuous stream of current data to  
user television equipment 22 out-of-band so that the  
program guide data is continuously available to the  
45 program guide. Alternatively, program guide data may  
30 be transmitted in-band over a dedicated analog channel,  
in the vertical blanking interval of a number of analog  
channels, or using any other suitable approach. If the  
50 continuous data stream is transmitted in-band over

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10 multiple channels, it may, for example, contain only data associated with the channel in which it is transmitted.

15 The continuous data stream may also be transmitted as one or more digital data tracks on one or more digital channels. One suitable approach may involve multiplexing different groups of digital channels onto different analog channels and transmitting a continuous digital data stream for each 20 group. Another suitable approach may involve distributing programmer provided in-band information (e.g., Program and System Information Protocol for Terrestrial Broadcast and Cable (PSIP) information, Digital Video Broadcast (DVB) System Information (SI), 25 etc.). This approach may eliminate the need for continuous data stream processor 71.

30 It may also be desirable for television distribution facility 16 to distribute multiple continuous data streams. Each continuous data stream 20 may, for example, correspond to different types or categories of program guide data. Each continuous data stream may, for example, carry data for creating different popular program guide display screens (e.g., one stream may carry listings for the current hour, one 35 stream may carry listings for movies, etc.). It may also be desirable, for example, to distribute a continuous data stream of program listings for each menu option of a main menu screen.

40 The second way that the interactive program 45 guide implemented on user television equipment 22 obtains program guide data is from program guide server 25 using client-server techniques. Program 50 guide server 25 may store program guide data in any

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10 suitable format, such as in the form of a SQL database.  
15 The interactive program guide may obtain program guide  
data from program guide server 25 by, for example,  
invoking a remote procedure call on program guide  
5 server 25, issuing messages or requests, or using  
suitable object based communications (any suitable  
combination of which are hereafter collectively  
referred to as "requests") via communications path 20.  
20 Program guide server 25 may process requests by  
25 querying storage device 56 for program guide data that  
satisfies the request. Program guide server 25  
retrieves the requested program guide data from storage  
device 56. Distribution equipment 21 may distribute  
the retrieved data over one of communications paths 20  
30 to the particular program guide that generated the  
request using, for example, an Internet-based  
addressing scheme. Alternatively, program guide server  
25 may distribute the program guide data to user  
television equipment 22 directly over the  
35 communications path 20.  
40 Program guide server 25 may reduce the time  
needed to access the program guide data using any  
suitable approach. Program guide server 25 may, for  
example, extract data needed to construct each of the  
45 most popular program guide display screens ahead of  
time and provide this pre-extracted data in response to  
requests. Program guide server 25 may also, for  
example, perform any necessary database joins required  
to build one or more intermediate tables of program  
50 guide data. This may relieve user television  
equipment 22 of the processing burden associated with  
such tasks.

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10 In addition, configuration information and user settings (e.g., favorite channel settings and the like) may be stored by user television equipment 22 or by program guide server 25. Frequently accessed  
15 5 settings are preferably stored by user television equipment 22, but may be prefetched based on a prediction by the program guide of the user's next likely action.

20 An illustrative arrangement for user  
10 television equipment 22 is shown in FIG. 2. Receiver 55 receives television programming and data from television distribution facility 16 (FIG. 1) at input 26. Receiver 55 may be based on any suitable hardware and software for receiving program guide data  
25 15 and television programs. During normal television viewing, tuner 51 of set-top box 28 tunes to a desired television channel based on inputs from the user on remote control 40. Tuner 51 may be based on any suitable hardware and software for tuning to analog or  
30 20 digital television channels.

35 Multiple tuners may be provided, but only one has been shown to avoid over-complicating the drawing. If multiple tuners are provided, the user's viewing (or playing) of a program may not be interrupted when the  
40 25 program guide obtains data. If, for example, program guide data is provided in-band on a dedicated analog channel, one tuner 51 may tune to an analog channel carrying television programming while another tuner 51 may tune to the dedicated channel. Alternatively, one  
45 30 tuner may be used to access the continuous data stream, and another to access program guide server 25. Program guide systems that use multiple tuners to obtain in-band data are described, for example, in concurrently

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10 filed Ellis U.S. patent application Serial No. 09/330,860. By using multiple tuners, the program guide may access program guide data without interrupting the display of television programming.

15 5 If user television equipment 22 has only a single tuner 51, television viewing may be interrupted when tuner 51 tunes to a separate channel to obtain in-band data (if provided on a dedicated channel, or, for example, when the user browses through channels) or  
20 10 data from program guide server 25. It may be desirable, therefore, to provide graphics, audio, or, video, in the continuous data stream that may be displayed or played by the program guide when the program guide obtains data not carried in-band on the  
25 15 channel the user is watching. If user television equipment 22 has multiple tuners, graphics, audio, or video carried in the continuous data stream may be displayed or played while the program guide obtains data from, for example, program guide server 25 or an  
30 20 in-band data stream on another channel.

35 35 The signal for the television channel to which tuner 51 is tuned is provided at video output 30. The signal supplied at output 30 is typically either a radio-frequency (RF) signal on a predefined channel  
40 25 (e.g., channel 3 or 4), or a analog demodulated video signal, but may also be a digital signal provided to television 36 on an appropriate digital bus (e.g., a bus using the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard). The video signal at  
45 30 output 30 may be received by optional secondary storage device 32.

50 Set-top box 28 may also include communications device 27 for transmitting requests to

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10 program guide server 25 over request communications path 70. Communications device 27 may be, for example, a modem (e.g., any suitable analog digital telephone dialup modem, or a cable modem), network interface card  
15 (e.g., an Ethernet card), or any other device suitable for transmitting requests to program guide server 25. Request communications path 20 is preferably a return-path on communications path 20, but may be a separate suitable communications path.

20 10 Secondary storage device 32 can be any suitable type of analog or digital program storage device or player (e.g., a videocassette recorder, a digital video disc (DVD) player with recording capabilities, etc.). Program recording and other  
25 15 functions may be controlled by set-top box 28 using control path 34. If secondary storage device 32 is a videocassette recorder, for example, a typical control path 34 involves the use of an infrared transmitter coupled to the infrared receiver in the videocassette  
30 20 recorder that normally accepts commands from a remote control such as remote control 40. Remote control 40 may be used to control set-top box 28, secondary storage device 32, and television 36.

35 35 The interactive television program guide may 40 run on set-top box 28, on television 36 (if television 25 36 has suitable processing circuitry and memory), or on a suitable analog or digital receiver connected to television 36. The interactive television program 45 guide may also run cooperatively on both television 36 30 and set-top box 28. Interactive television application systems in which a cooperative interactive television program guide application runs on multiple devices are 50 described, for example, in Ellis U.S. patent

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10 application Serial No. 09/186,598, filed November 5, 1998, which is hereby incorporated by reference herein in its entirety.

15 If desired, set-top boxes 28 may be used that contain digital storage devices such as digital storage device 31 that allow the user to record programs and program data in digital form. Digital storage device 31 may be a writeable optical storage device (such as a DVD player capable of handling recordable DVD discs), a 20 magnetic storage device (such as a disk drive or digital tape), or any other digital storage device.

25 Interactive television program guide systems that have digital storage devices are described, for example, in Hassell et al. U.S. patent application Serial No.

30 15 09/157,256, filed September 17, 1998, which is hereby incorporated by reference herein in its entirety.

35 Digital storage device 31 can be contained in set-top box 28 or it can be an external device connected to set-top box 28 via an output port and an appropriate interface. If necessary, processing circuitry in set-top box 28 may be used to format the received video, audio, and data signals into a digital file format. The file format may be an open file format such as the Moving Pictures Expert Group (MPEG) 40 MPEG-2 standard. The resulting data may be passed to digital storage device 31 via an appropriate bus (e.g., a bus using the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard) and may be stored on digital storage device 31.

45 30 Television 36 receives video and audio signals from secondary storage device 32 via communications path 38. The signals on communications path 38 may either be generated by secondary storage

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device 32 when playing back a prerecorded storage  
10 medium (e.g., a videocassette or a recordable digital  
video disc), by digital storage device 31 when playing  
back a prerecorded digital medium, may be passed  
15 through from set-top box 28, may be provided directly  
to television 36 from set-top box 28 if secondary  
storage device 32 is not included in user television  
20 equipment 22, or may be received directly by  
television 36. During normal television viewing, the  
10 signals provided to television 36 correspond to the  
desired channel to which the user has tuned with  
set-top box 28. The signals may also be provided to  
25 television 36 by set-top box 28 when set-top box 28 is  
used to play back information stored on digital storage  
15 device 31.

A more generalized embodiment of user  
30 television equipment 22 of FIG. 2 is shown in FIG. 3.  
As shown in FIG. 3, program guide data from television  
distribution facility 16 (FIG. 1) is received by  
20 control circuitry 42 of user television equipment 22.  
The functions of control circuitry 42 (e.g., obtaining  
program guide data from the continuous stream of  
current program guide data, obtaining program guide  
35 data from program guide server 25, generating program  
guide display screens, program recording, etc.) may be  
provided using the set-top box arrangement of FIG. 3.  
Alternatively, these functions may be integrated into  
an advanced television receiver, personal computer  
40 television (PC/TV), a personal computer with a  
television tuner card, or any other suitable  
45 arrangement. If desired, a combination of such  
30 arrangements may be used.

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10 Control circuitry 42 may include any suitable processor, such as a microprocessor, and suitable support circuitry such as caching circuitry, direct memory access (DMA) circuitry, input/output (I/O) 15 circuitry, etc. Control circuitry 42 may include memory 44. Memory 44 may be any memory or other storage device, such as a random access memory (RAM), read only memory (ROM), flash memory, a hard disk drive, a combination of such devices, etc., that is 20 suitable for storing program guide instructions for execution by control circuitry 42. It should be understood that memory 44 may temporarily cache program 25 guide data when, for example, generating a program guide display screen. Such caching or temporary buffering of data such as the data received from the continuous stream of current program guide data by 30 memory 44 should not be confused, however, with the substantial use of memory in other program guide systems to store a database of program guide data that 35 is refreshed by periodic downloads.

Set-top box 28 may also include 40 communications device 27 for transmitting requests to program guide server 25 over request communications path 70. Communications device 27 may be, for example, 45 a modem (e.g., any suitable analog digital telephone dialup modem, or a cable modem), network interface card (e.g., an Ethernet card), or any other device suitable for transmitting requests to program guide server 25. Request communications path 20 is preferably a return- 50 30 path on communications path 20, but may be a separate suitable communications path.

User television equipment 22 may also have secondary storage device 47 and digital storage device

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10                  49 for recording programming. Secondary storage device  
47 can be any suitable type of analog or digital  
program storage device (e.g., a videocassette recorder,  
a digital video disc (DVD) player with recording  
15                  5 capabilities, etc.). Program recording and other  
functions may be controlled by control circuitry 42.  
Digital storage device 49 can be, for example, a  
writeable optical storage device (such as a DVD player  
20                  20 capable of handling recordable DVD discs), a magnetic  
storage device (such as a disk drive or digital tape),  
or any other such suitable digital storage device.

25                  The user may control the operation of user  
television equipment 22 with user interface 46. User  
interface 46 may be a pointing device, wireless remote  
30                  15 control, keyboard, dedicated sets of buttons (e.g.,  
buttons located on various hardware components), touch-  
pad, voice recognition system, or any other suitable  
user input device. To watch television, the user may  
instruct control circuitry 42 to display a desired  
35                  20 television channel on monitor 45. To access the  
functions of the program guide, the user may instruct  
the program guide to generate a main menu or other  
desired program guide display screen for display on  
monitor 45.

40                  25 When a user indicates a desire to access the  
interactive television program guide (e.g., by using a  
"menu" key on remote control 40), the program guide  
generates an appropriate program guide display screen  
45                  30 for display on monitor 45. A main menu screen, for  
example, such as illustrative main menu screen 100 of  
FIG. 4, may be generated that provides the user with  
access to various program guide functions. Main menu

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10 screens may also contain various advertisements, logos,  
etc.

15 Illustrative main menu screen 100 of FIG. 4,  
for example, may include menu 102 of selectable program  
5 guide options 106. If desired, the program guide  
options 106 may be organized according to feature type.  
In menu 102, for example, program guide options 106  
have been organized into three columns. The column  
labeled "TV GUIDE" is for listings related features,  
20 10 the column labeled "MSO SHOWCASE" is for multiple  
service organization (MSO) related features, and the  
column labeled "VIEWER SERVICES" is for viewer related  
features. The interactive television program guide may  
generate a display screen for a particular program  
25 15 guide feature when the user selects that feature from  
menu 102.

30 Main menu screen 100 may include one or more  
selectable advertisements 108. Selectable  
advertisements 108 may, for example, include text and  
20 graphics advertising pay-per-view programs. When the  
user selects a selectable advertisement 108, the  
35 program guide may display information (e.g., pay-per-  
view information) or take other actions related to the  
content of the advertisement. Pure text advertisements  
40 25 may be presented, if desired, as illustrated by  
selectable advertisement banner 110.

45 Main menu screen 100 may also include other  
screen elements. The brand of the program guide  
product may be indicated, for example, using a product  
30 30 brand logo graphic such as product brand logo  
graphic 112. The identity of the television service  
provider may be presented, for example, using a service  
50 provider logo graphic such as service provider logo

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10 graphic 114. The current time may be displayed in  
clock display region 116. In addition, a suitable  
indicator such as indicator graphic 118 may be used to  
indicate to the user that a message from a cable  
15 5. operator is waiting for the user if the program guide  
supports messaging functions.

20 One function of the interactive television  
program guide may be to provide the user with the  
opportunity to view television program listings. A  
25 10 user may indicate a desire to view program listings by,  
for example, positioning highlight region 120 over a  
desired program guide option. Alternatively, the  
program guide may present program listings when the  
user presses a suitable key (e.g., a "guide" key) on  
30 15 remote control 40. When the user indicates a desire to  
view television program listings, the program guide may  
obtain program listings data from the continuous data  
stream or by request from server 25 and may generate an  
appropriate program listings screen for display on  
35 20 monitor 45. A program listings screen may contain one  
or more groups or lists of program listings organized  
according to one or more organization criteria (e.g.,  
by program category).

40 The program listings screen may be overlaid  
45 25 over a program being viewed by the user or overlaid  
over a portion of the program in a "browse" mode. The  
program guide may, for example, provide the user with  
the opportunity to view listings by time, by channel,  
according to a number of categories (e.g., movies,  
50 30 sports, children, etc.); or may allow the user to  
search for a listing by title. Program listings may be  
displayed using any suitable list, table, grid, or  
other suitable display arrangement. If desired,

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10 program listings display screens may include selectable advertisements, product brand logo graphics, service provider brand graphics, clocks, or any other suitable indicator or graphic.

15 5 FIGS. 5a and 5b illustrate the display of program listings by time and by channel, respectively. The program listings display screens 130 and 135 of FIGS. 5a and 5b may include highlight region 151, which highlights the current program listing 150. The user

20 10 may position highlight region 151 by entering appropriate commands with user interface device 52. For example, if user input interface device 52 has a keypad, the user can position highlight region 151 using "up," "down," "left," and "right" arrow keys.

25 15 Remote program listings may also be panned left, right, up, and down by positioning highlight region 151 using the arrow keys on remote control 40. Alternatively, a touch sensitive screen, trackball, voice recognition device, or other suitable device may be used to move

30 20 highlight region 151 or to select program listings without the use of highlight region 151. In still another approach, the user may speak a television program listing into a voice request recognition system. These methods of selecting program listings

35 25 are merely illustrative. Any other suitable approach for selecting program listings may be used if desired.

40 45 The program guide may provide the user with the opportunity to view program listings for other times or channels. The user may indicate a desire to 30 access listings for other times or channels by, for example, using "left" and "right" arrow keys to change time slots (when program listings are presented by time 50 as shown in FIG. 5a), or "left" and "right" arrow keys

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10 to change channels (when program listings are presented by channel as shown in FIG. 5b). In response to such an indication, the program guide may, for example, scroll or page the program listings to display  
15 5 additional program listings.

15 The program guide uses the continuous stream of current program guide data as a low-latency source of current program listings and other frequently requested information. The program guide uses  
20

10 server 25 to supply data on request typically when data is needed less urgently. The program guide may, for example, retrieve program listings data from the continuous data stream whenever the data to be retrieved is related to current programming (i.e.,  
25 15 programming that is being broadcast or that is scheduled to be available in the next few hours).

30 If desired, the program guide may be configured to recognize the type of program guide data carried in the data stream (e.g., based on attribute  
20 fields in the continuous data stream). If the program guide has the capability to recognize data in the continuous data stream, the program guide may be configured to always attempt to retrieve data from the continuous data stream (either before or at the same  
35 40 time that the program guide attempts to request data from server 25). The program guide may obtain data from the continuous data stream or from program guide server 25 based on when particular program guide functions are accessed. These examples are merely  
45 30 illustrative. The program guide may use these and other suitable techniques for accessing data in the continuous data stream and requesting data from server 25.

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As mentioned above, the program guide may be  
10 programmed to always retrieve television program  
listings for the current time of day from the  
continuous data stream. This may occur, for example,  
15 5 in response to the user indicating a desire to access  
program listings (e.g., by selecting "by time" feature  
from main menu screen 100). If the user indicates a  
desire to see program listings for a time other than  
20 the current time of day (e.g., by using remote control  
10 arrow keys to select program listings many hours or  
days in the future), the program guide may generate a  
request for obtaining those program listings and may  
transmit the request to program guide server 25 over  
25 communications path 20. If desired, the program guide  
15 may also prefetch program listings for other time slots  
from the continuous data stream or program guide  
server 25.

After a user selects a program listing, the  
interactive program guide may provide the user with  
20 20 access to a number of program guide functions  
associated with the selected listing. The program  
guide may, for example, provide the user with  
additional program information for the program  
listings. This may be done in response to a user  
40 25 indicating a desire to access additional program  
information by, for example, positioning highlight  
region 151 (FIGS. 5a and 5b) over a listing 150 and  
pressing an "info" key on remote control 40.

The program guide may obtain the additional  
45 30 program information by requesting the additional  
program information from program guide server 25. The  
program guide makes such requests, for example,  
50 whenever the program guide determines that the

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- 10 additional program guide information is not included in  
the continuous data stream, or if the program guide has  
been configured to automatically obtain all additional  
program information from program guide server 25. In  
15 practice, additional program information (at least  
additional program information for programs other than  
current programs) is preferably not included in the  
continuous data stream due to bandwidth constraints.  
Additional program information for a listing or group  
20 of listings may, for example, be prefetched from  
program guide server 25 when a user highlights a  
particular program listing, when the program guide  
displays listings on a display screen, or in response  
25 to any other suitable event.
- 25 15 Once the program guide has obtained the  
additional program information from the continuous data  
stream or program guide server 25, the program guide  
may generate an additional program information screen.  
An illustrative additional program information  
30 20 screen 161 is shown in FIG. 6. Like other program  
guide display screens, additional program information  
screen 161 may include selectable advertisements,  
service provider logos, brand logos, a mail indicator,  
35 25 and a clock region. Additional program information  
screen 161 may also include program information window  
162 for displaying the additional program information  
retrieved by the program guide. If a portion of the  
additional program information extends past the bottom  
40 30 of program information window 162, the user may, for  
example, use a remote control arrow key to scroll  
through the additional program information.
- 45 The program guide may display program  
listings organized by category. In practice, such a  
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10 function may require the program guide to obtain  
program listings data from program guide server 25,  
because including category information for the program  
listings in the continuous data stream may require too  
15 5 much bandwidth, or because sorting program listings  
based on category attributes may be a heavier  
processing burden to place on user television  
equipment 22 than is desired.

20 If the user selects "Movies," "Sports," or  
25 10 "Children" selectable program guide options 106 of main  
menu 102 (FIG. 4), for example, the program guide may  
issue a request to program guide server 25 querying  
program guide server 25 for program listings of the  
appropriate category. Alternatively, if the program  
15 15 listings in the continuous data stream are accompanied  
by category information, the program guide may filter  
program listings from the continuous data stream based  
on the appropriate category, and may retrieve  
30 additional listings in that category from program guide  
20 server 25.

35 FIG. 7 shows illustrative program listings by  
category screen 180 in which program listings for  
movies are displayed. Program listings by category  
screen 180 may be generated by the program guide when,  
40 25 for example, the user selects the "Movies" selectable  
feature 106 of FIG. 4. Similar program listings by  
category screens 180 may be generated by the program  
guide in which program listings are sorted by any  
45 suitable category.

30 30 Program listings by category screen 180 may  
include, for example, selectable advertisements,  
service provider logos, brand logos, advertisement  
banners, a mail indicator, and a clock region. Program  
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10                   listings for the selected category may be displayed in  
list 182. The program guide may also provide the user  
with access to additional features related to a  
particular listing when, for example, the user selects  
15                   that listing. The user may view program listings for  
additional time slots or channels on screen 180 by, for  
example, using remote control arrow keys to manipulate  
the display.

20                   The interactive program guide may allow the  
10 user to view program listings while watching television  
programming by, for example, overlaying a "FLIP" or  
"BROWSE" display region over a television program.

25                   FIG. 8a shows an illustrative FLIP display 200 that the  
program guide may display whenever the user changes  
15 television channels. The FLIP display may contain  
information associated with the current program, such  
as the program title 210, run time 215, the current  
channel number 216, and the current channel's call  
letters 225. The FLIP display may also include a  
20 number of graphics, such as brand logo 230, a  
sponsorship graphic, a channel logo graphic, mail  
indicator or any other suitable graphic. The program's  
rating may also be displayed. If desired, brand  
logo 230 may be replaced with or used together with a  
25 selectable information icon. The user may select the  
selectable information icon to obtain additional  
program information for the program currently displayed  
in FLIP display 200.

45                   FLIP display 200 may also include rating  
30 indicator 227 for indicating the rating of the current  
program. Rating information may be carried in the  
continuous data stream. If the program guide provides  
50 a parental control feature, the rating of the program

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10 on each new channel the user tunes to may be examined  
by the program guide to determine if the program meets  
parental control settings that were previously  
established by the user. If the program rating is not  
5 acceptable, the program guide may, for example, display  
15 only the FLIP banner without the program video.

20 FIG. 8b shows an illustrative "BROWSE"  
overlay or display that the program guide may display  
when the user opts to browse through program listings  
10 for a given time slot. The user may browse through  
program listings by, for example, using remote control  
arrow keys.

25 The FLIP and BROWSE overlays of FIGS. 8a and  
8b have been shown as including a brand logo displayed  
15 at the left of the overlay. The logo may also, for  
example, promote different sponsors as the user browses  
30 program listings or flips between channels. The logos  
may change within the same overlay or banner if the  
user displays the overlay or banner for a predefined  
20 time. The logo may, for example, automatically rotate  
through a list of logo advertisements, returning to the  
first advertisement after each advertisement in the  
list has been displayed. The brand logo may also be  
35 replaced by a text based advertisement.

40 25 Program listings data for the FLIP overlay  
may be obtained by the program guide from the  
continuous data stream when the user changes channels.  
Program listings data for the BROWSE overlay may also  
45 be obtained by the program guide from the continuous  
30 data stream, but may also be obtained from program  
guide server 25 if the user indicates a desire to view  
program listings data not carried in the continuous  
50 data stream (e.g., program listings for programs not in

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more than a few hours in the future). If desired, program listing data may be prefetched for adjacent time slots from program guide server 25 when, for example, FLIP information is displayed, when the user indicates a desire to enter the browse mode, or in response to any other suitable event.

20 The program guide may provide functions that involve various real-time actions related to the broadcast of a specific program or series. For example, the program guide may allow the user to set reminders, order pay-per-view programs, record programs, lock and unlock programs, etc. These functions involve actions that are performed by the

25 15 program guide in coordination with programs as they are broadcast. For example, a program guide reminder function may allow a user to set a reminder for upcoming airing of a program. Just before the broadcast of the program, the program guide displays a

30 20 reminder on the user's television. The reminder alerts the user that the program is about to begin. Thus the program guide action of displaying the program reminder must be coordinated with the broadcast of the program.

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If all programs were broadcast at their  
40           25 scheduled broadcast times, the program guide could  
              simply rely upon program listings data provided to the  
              program guide that specifies when each program is to be  
              broadcast. However, programs are sometimes not aired  
45           30 at their scheduled times. This may occur, for example,  
              when a sporting event that precedes a given television  
              program runs longer than expected.

In order to accommodate unexpected shifts in  
the broadcast times of certain programs, each airing of

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- 10 a program may be assigned a unique identifier. The  
identifier may be assigned, for example, at main  
facility 12 and may be distributed by distribution  
equipment 21. Unique identifiers may also be assigned  
15 5 to program groupings (e.g., series, mini-series,  
orderable packages of programs, or other suitable  
groupings of programs). The identifiers associated  
with each program or program grouping may be provided  
to the program guide with the program listings data.  
20 10 When a user sets a reminder or uses other such  
functions, the program guide may store the identifier  
in memory in user television equipment 22. At an  
appropriate time (e.g., before or during the broadcast  
25 15 of a program), each unique identifier is placed into  
the continuous data stream. The program guide may  
therefore monitor the stream to determine in real-time  
whether a particular program (e.g., a single program or  
30 20 a program in a program grouping for which a reminder  
was set) is being broadcast. If the broadcast time of  
25 a program shifts, the reminder function will still  
notify the user at the appropriate time (i.e., just  
35 30 before the program airs).

40 The unique identifier in the data stream may  
be transmitted, for example, when a program starts,  
25 when a program ends, or continuously during a program.  
If there are any schedule changes, the unique  
identifiers for programs whose broadcast times have  
shifted may be transmitted at the correct times to  
45 reflect these changes. Thus, a selected program can be  
30 rescheduled for a different time, day, or channel and  
the associated action will still be performed correctly  
50 by the program guide.

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When the user first accesses a function of  
10 the program guide that involves a real-time action  
associated with a program or series (e.g., when the  
user of the program guide sets up a reminder or the  
15 like), the program guide may retrieve the unique  
identifier from the continuous data stream (if it is  
available) or may request the unique identifier from  
program guide server 25. The identifier is then stored  
20 locally on the user television equipment for future  
comparison to the identifiers provided in the  
continuous stream of current data.

The program guide may maintain a list of  
25 upcoming actions on user television equipment 22.  
Preferably, the list of upcoming actions is maintained  
30 15 in a memory such as memory 44 in control circuitry 42  
of user television equipment 22 (FIG. 3). The program  
guide may store the unique identifier and the requested  
associated action in the list. The program guide may  
monitor the continuous data stream for unique  
35 20 identifiers and perform listed actions when their  
associated unique identifiers appear in the continuous  
data stream. If a unique identifier is for a series,  
the program guide may perform the listed action every  
time a program in the series is shown. The program  
40 25 guide may ignore any identifier that appears in the  
continuous data stream that does not match an action in  
the list. In addition, the program guide may allow  
actions to expire and may remove them from the list if  
the identifier associated with the action is not  
45 30 detected in the continuous data stream for a predefined  
period of time.

One function that may involve a real-time  
50 action associated with a television program is a

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10 reminder function. The program guide may provide the user with the opportunity to set a program reminder to be displayed at, for example, the start time of a program. The program guide may present the user with  
15 5 opportunities to set reminders whenever the user indicates an interest in a future program (e.g., by pressing a remote control enter key after highlighting a future program listing), or in response to any other suitable event. The user may indicate a desire to set  
20 10 a program reminder by, for example, pressing a "remind" button on remote control 40.

25 If the user indicates a desire to set a program reminder by, for example, highlighting a listing in program listing screens 130 or 135 and  
15 pressing a "remind" key on remote control 40, the program guide may generate a suitable reminder overlay. FIG. 9a shows illustrative overlay 300. The program  
30 30 guide may prompt the user to set a reminder and provide the user with the opportunity to select, for example,  
20 "Yes" button 305 to set the reminder or "No" button 307  
35 to cancel.

40 If the user attempts to set a reminder for a program or series for which a reminder has already been set, the program guide may provide the user with the  
25 45 opportunity to cancel the reminder by, for example, displaying reminder confirmation overlay 310 of FIG. 9b. If the user deletes a reminder, the program guide may delete the unique identifier for the selected showing and the associated reminder from the local list  
30 50 of actions.

When the program guide detects the unique identifier for the program for which the reminder was set in the continuous data stream, the program guide

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10 checks the local list of scheduled real-time actions  
and determines that the associated action involves  
displaying a reminder. The program guide then displays  
the reminder for the program. Multiple reminders may  
15 5 be displayed simultaneously if desired. In addition,  
the program guide may, for example, prefetch program  
listings data and additional program data for a program  
or group of programs from the continuous data stream or  
from program guide server 25 when a reminder is  
20 10 displayed.

25 The program guide may also provide users with  
the opportunity to set reminders for program groupings.  
If, for example, a user wishes to receive a reminder  
for the series "Mad About You" any time an episode in  
30 15 the series is shown, the user may set such a reminder  
for the series using any suitable approach. Program  
grouping reminder lists and related display screens are  
described, for example, in concurrently filed Knudson  
et al. U.S. patent application Serial No. 09/330,792,  
35 20 which is hereby incorporated by reference herein in its  
entirety.

40 In response to a user indicating a desire to  
set a reminder for a program grouping, the program  
guide may store the program grouping identifier in the  
25 list of real-time actions. In this example, the  
program guide would store the program grouping  
identifiers for the series "Mad About You" in a list of  
reminders.

45 Each time an episode in the series "Mad About  
30 You" is aired, the program grouping identifier for the  
series is placed into the continuous data stream. The  
identifier may, for example, be provided continuously

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10 by main facility 12 and passed to distribution equipment 21 from continuous data stream processor 71.

15 The program guide may monitor the continuous data stream and compare the identifiers in the data stream with the identifiers in the list of real-time actions. When the identifier for the program grouping is found, which in this example would be the program grouping identifier for the series "Mad About You", the program guide performs the associated real-time action

20 (e.g., displays a reminder).

25 FIG. 10a and 10b show illustrative program reminder lists 320. In FIG. 10a, reminder list 320 is overlaid on top of the currently display television program to provide the user with the opportunity to view a reminder while still viewing a portion of the television program that the user was watching. In FIG. 10b, reminder list 320 is shown overlaid on top of a program listings display screen, such as program listings display screen 130 of FIG. 5a. The program

30 20 guide may provide the user with the opportunity to scroll through reminder list 320 by, for example, using remote control arrow keys.

35 Another example of a real-time action that may be taken by the program guide is the authorization 40 of the viewing of a pay-per-view program. The program guide may authorize viewing based on when the identifier of the desired pay-per-view program is detected in the continuous data stream, thereby preventing errors if the schedule shifts and the like.

45 30 The program guide may provide the user with an opportunity to order a pay-per-view program when the user selects a pay-per-view program listing from a group of listings, the user presses an "order" key (or

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10 other suitable key) on remote control 40 when tuned to  
an unordered pay-per-view channel, or in response to  
any other suitable event.

15 The program guide may, for example, display a  
5 pay-per-view program listings display screen, such as  
illustrative pay-per-view program listings display  
screen 350 of FIG. 11a, in response to the user  
selecting "PPV TIME" feature 106 of main menu 102  
(FIG. 4). Like program listings display screens 130  
20 and 135 of FIGS. 5a and 5b, pay-per-view program  
listings screen 350 may include selectable  
advertisements, service provider logos, brand logos, a  
mail indicator, a clock region, etc. The program guide  
25 may display listings for pay-per-view programs in other  
15 time slots and additional channels when the user  
presses remote control arrow keys. The program guide  
may obtain pay-per-view program listings data for  
30 display in pay-per-view program listings screen 350  
from the continuous data stream or from program guide  
server 25. As with non-pay-per-view program listings,  
35 data for currently available pay-per-view programs and  
those that are available in the next few hours may be  
provided in the continuous data stream. Data relating  
to pay-per-view programs at later times is available on  
40 request from server 25.

45 The program guide may provide the user with  
an opportunity to order a pay-per-view program for a  
selected listing. An illustrative pay-per-view  
ordering overlay 370 is shown in FIG. 11b. The program  
30 guide may display pay-per-view ordering overlay 370  
when, for example, the user highlights a pay-per-view  
50 program listing and presses an "order" or other  
suitable key on remote control 40. Pay-per-view

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10 ordering overlay 370 may display pay-per-view program information 372 and ordering information 374, and may prompt the user to order the selected pay-per-view program by entering a purchase code. The user may  
15 5 enter the purchase code using, for example, number keys on remote control 40, or may cancel the purchase and return to the last screen by selecting "CANCEL" button 376. The program guide may also provide the user with the opportunity to confirm the pay-per-view  
20 10 order using illustrative order confirmation overlay 380 of FIG. 11c. If desired, the program guide may display order confirmation overlay 380 of FIG. 11c instead of pay-per-view ordering overlay 370 to provide the user with the opportunity to order a pay-per-view program  
25 15 without requiring the user to enter a purchase code.

30 The program guide may have obtained the unique identifier for the particular showing of the selected pay-per-view program when it retrieved listings data from either the continuous data stream or  
35 20 program guide server 25. Otherwise, the program guide may query program guide server 25 at this point to obtain the unique identifier. The program guide may search the locally maintained list of upcoming actions for the identifier to determine if the selected pay-  
40 25 per-view program has been ordered. As shown in FIG. 11d, the program guide may indicate to the user that the pay-per-view program has already been ordered, and may provide the user with the opportunity to cancel the current order by displaying, for example, overlay  
45 30 390.

50 The program guide may also search the continuous data stream for the unique identifier of the selected pay-per-view program to determine if the

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10 selected program is being broadcasted at the time the user is placing the order. As shown in FIG. 11e, the program guide may indicate to the user that the program is being shown by, for example, displaying overlay 395,  
5 and providing the user with the opportunity to cancel the order.

15 Once a pay-per-view program has been ordered, the program guide may store its unique identifier and the associated action (i.e., a pay-per-view program  
20 authorization) in a list of such actions (i.e., as a list of ordered pay-per-view programs that are to be authorized). While the user watches television or is using the program guide, the program guide may monitor the continuous data stream for unique identifiers and  
25 compare the received identifiers to the identifiers in the list. If, for example, the program guide receives the identifier for the ordered pay-per-view program when the pay-per-view program starts, the program guide may indicate to the user that the pay-per-view program  
30 is starting. The program guide may, for example, overlay a window or banner over the television program that the user is watching as shown in FIG. 12a, or may overlay a banner or window over a program guide display screen that the user has accessed, as shown in FIG.  
35  
40 25 12b. The program guide may provide the user with an opportunity to tune to the pay-per-view program by, for example, selecting "Yes" button 400 of FIGS. 12a and 12b. If desired, the program guide may prefetch program listings data or additional program data for  
45 30 the pay-per-view program from the continuous data stream or from program guide server 25 when the window or banner is displayed.

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10 It is possible that a user may not have used  
user television equipment 22 for the period of time  
during which the ordered pay-per-view program was  
aired. The program guide may delete such entries after  
15 a predefined period of time. The program guide may  
also indicate to a user that the user has missed an  
ordered pay-per-view program. The program guide may,  
for example, check the list of ordered pay-per-view  
programs periodically (e.g., every few minutes) and may  
20 compare the stored identifiers to the unique  
identifiers carried in the continuous data stream.  
Identifiers may, for example, include a date and time  
component, or may be sequentially numbered based on the  
times the programs are broadcasted. The program guide  
25 may compare the identifiers carried on the continuous  
data stream to the identifiers in the list of ordered  
programs and may determine if any of the programs in  
the list have already been viewed.

30 The program guide may indicate to the user  
35 that an action such as a scheduled pay-per-view program  
authorization is no longer current by, for example,  
displaying an overlay or window over a television  
program or program guide display screen. FIGS. 13a and  
13b show illustrative windows 410 that are overlaid on  
40 top of a television program and a program guide display  
screen, respectively, and that display a missed pay-  
per-view program and prompt the user to indicate  
whether the user wishes to reschedule. The user may  
45 reschedule the missed pay-per-view program by, for  
example, selecting "Yes" button 415. The program guide  
50 may reschedule the pay-per-view program by, for  
example, querying program guide server 25 (FIG. 1) for  
the next showing of the program and storing the unique

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10 identifier for that showing of the program in a list of actions (i.e., a list of upcoming reminders, upcoming pay-per-view authorizations, etc.) with an associated action code.

15 5 The program guide may also provide a user with the opportunity to order a package of pay-per-view programs. Program guide systems that provide a user with the opportunity to purchase a package of pay-per-view programs and illustrative display screens, are

20 10 described, for example, in Knudson et al. U.S. patent application Serial No. 08/944,153, filed October 6, 1997, which is hereby incorporated by reference herein in its entirety. The program guide may authorize the viewing of a pay-per-view package in a way similar to

25 15 how it authorizes the viewing of a program. In response to the user indicating a desire to order a pay-per-view package, the program guide may store an identifier and the associated action (i.e., a pay-per-view program package authorization) in a list of such 30 20 actions (i.e., as a list of ordered pay-per-view programs that are to be authorized).

35 Whenever a pay-per-view program in the package is available, the identifier for the package is transmitted in the continuous data stream. While the 40 25 user watches television or is using the program guide, the program guide may monitor the continuous data stream and compare the received identifiers to the identifiers in the list. When the unique identifier 45 30 for the package is transmitted, the program guide may indicate to the user that one of the ordered programs is starting.

50 In another suitable approach, the program guide may store the unique identifiers of each of the

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10 programs of the package in the list. Whenever a  
program in the package is available, its unique  
identifier is transmitted in the continuous data  
stream. The program guide may receive the unique  
15 identifiers for each program as they are aired, compare  
them to the list, and authorize the airing or perform  
another function (e.g., indicate the program is  
starting, indicate the program was aired, etc.).

20 The program guide may also provide the user  
25 with the opportunity to record programs. FIGS. 14a and  
14b show illustrative overlays that may be displayed by  
the program guide in response to a user indicating a  
desire to record a program. FIG. 14a may be displayed  
when, for example, a user indicates a desire to record  
15 the program that the user is watching (e.g., by  
pressing a "record" key on remote control 40). FIG.  
14b shows an illustrative overlay that may be overlaid  
a program listings display screen when, for example, a  
user highlights a listing and indicates a desire to  
20 record the listing (e.g., by pressing a "record" key on  
remote control 40). The overlay may prompt the user to  
confirm the record. These ways of providing a user  
with the opportunity to record a program are only  
35 illustrative and any other suitable approach may be  
40 used.

45 After the user has indicated a desire to  
record a program and, if desired, confirmed the record,  
the program guide may save the identifier of the  
program and the associated action (i.e., a program  
50 record) in a list of such actions (i.e., as a list of  
programs to record). The program guide may also  
provide the user with the opportunity to record a  
program grouping and may save a program grouping

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identifier when the user indicates a desire to do so.  
10 The program guide may then monitor the continuous data stream for the unique identifier. If desired, the program guide may monitor the continuous data stream in  
15 a power-save mode. When the unique identifier for the program or program grouping is transmitted in the continuous data stream, the program guide may record the program or program grouping on digital storage device 31 or 49 (as shown in FIGS. 2 and 3,  
20 10 respectively), or, on secondary storage device 32 or 47 (as shown in FIGS. 2 and 3, respectively).  
Another example of a real-time action that  
25 may be taken by the program guide is locking a program and requesting a parental control code when a user  
30 15 attempts to view a locked program (or program guide data for a program). Locking a program includes locking all showings of a particular program and locking all showings of programs in a program grouping.  
FIG. 15a shows an illustrative parental control overlay  
35 20 1500 that the program guide may display in response to a user indicating a desire to lock a program. FIG. 15a shows overlay 1500 overlaid a program listings screen. The program guide may also display overlay 1500 over a program that the user is watching.  
40 25 A user may indicate a desire to lock programs by, for example, highlighting its listing and pressing a "lock" key or remote control 40. In response, the program guide may display overlay 1500 and provide the user with the opportunity to, for example, lock  
45 30 programs by title, rating, channel, or any other suitable criteria. Locking by title includes, for example, locking all showings of a particular program and locking all showings of programs in a program  
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10 grouping. In response to the user locking a program,  
the program guide may save the identifier of the locked  
program and the associated action (i.e., a program  
lock) in a list of such actions (i.e., as a list of  
5 locked programs). If programs have been locked by  
15 title, the program guide may, for example, store an  
identifier of the program grouping (e.g., a series) in  
the list of associated actions.

20 When a user tunes to a program, the program  
10 guide may obtain a unique identifier for the program  
(or its grouping) and compare it to identifiers in the  
list of identifiers. If the identifier for the program  
(or its grouping) is present in the list, the program  
25 guide may determine that the associated real-time  
15 action is, for example, the locking of the program. If  
the program guide determines that the program is  
locked, the program guide may display parental control  
30 overlay 1510. When the user enters the correct  
parental control code, the program guide may delete the  
20 unique identifier for the program from the list and  
display the program. Alternatively, the program guide  
35 may leave the identifier in the list (e.g., when it is  
a program grouping identifier) and allow the user to  
view the current showing.

40 25 FIG. 15b shows an illustrative parental  
control overlay 1510 that the program guide may display  
when a user indicates a desire to access a program that  
has been parentally locked. FIG. 15b shows overlay  
45 1510 that may be displayed when a user tunes to a  
30 locked program (e.g., by flipping to a channel as  
shown, turning to a channel from a browse overlay, or  
by tuning to a channel from another program guide  
50 display screen).

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10                 The program guide may also display parental control overlay 1510 when the user indicates a desire to access program guide data for a locked program. When the user indicates a desire to access program  
15                 5 guide data either from the continuous data stream or from program guide server 25, the program guide may obtain the identifier for the program (or grouping), compare it to the list of identifiers, and prompt the user for a parental control code.

20                 10 FIGS. 16-18 are flowcharts of illustrative steps involved in operating the interactive program guide system of the present invention. The steps shown in FIGS. 16-18 are illustrative and may be combined and performed in any suitable order.

25                 15 FIG. 16 shows illustrative steps involved in obtaining program guide data with the program guide. At step 500, program guide data is received at television distribution facility 16 from main facility 12. A first portion of the program guide data  
30                 20 is distributed by television distribution facility 16 to each of the program guides implemented on user television equipment 22 over communications paths 20 (step 510). This first portion of the program guide data may contain, for example, program guide listings  
35                 25 data for the current time of day, unique identifiers for showings of programs for the current time of day, and any other program guide data that is to be distributed in the continuous stream of current data.

40                 45 The first portion of the program guide data  
45                 30 may be transmitted as a continuous data stream using any suitable transmission technique. It may be transmitted, for example, on a television channel sideband, in the vertical blanking interval of a

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10 television channel, on a dedicated analog or digital channel, across multiple analog or digital channels, or by any other suitable data transmission technique.

15 At step 520, a second portion of the program guide data is stored by program guide server 25 at television distribution facility 16. If desired, program guide server 25 may be used to store a copy of the information contained in the continuous data stream.

20 10 At steps 530 and 540, the program guide obtains program guide data from the continuous data stream and from program guide server 25, respectively. The program guide may, for example, be preprogrammed to obtain certain types of data from the continuous data stream and other types of data from program guide server 25. Alternatively, the continuous program guide data stream may contain attributes that indicate to the program guide the type of data that is contained in the data stream. Steps 530 and 540 may be performed in any 25 suitable order, concurrently, and when the program guide is prefetching data.

30 15 If one of the links for the two delivery mechanisms is not operating properly, the program guide may temporarily use one delivery mechanism exclusively.

35 20 25 If the link supporting server communications fails, the program guide may temporarily operate using only the continuous data stream. Only access to current program listings (or listings for the next few hours) would be provided. If the link supporting the continuous data 30 stream fails, the program guide may temporarily operate using only the server link, although with increased latency when accessing current data.

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10 Steps 545, 550, and 555 are illustrative  
steps that may be involved in obtaining program guide  
data from program guide server 25 with the program  
guide. At step 545, the program guide may request  
15 5 program guide data from program guide server 25. As  
mentioned above, the request that is issued by the  
program guide may include any suitable remote procedure  
call, message, request, object based communication, or  
any other suitable request. At step 550, program guide  
20 10 server 25 may process the request and may transmit the  
requested data to the program guide over communications  
path 20 (step 555).

25 FIG. 17 illustrates steps involved in  
providing the user with program listings data and  
15 additional program information using the program guide.  
At steps 600 and 610, program listings data is obtained  
with the program guide from the continuous data stream  
and program guide server 25. Steps 600 and 610 may be  
30 20 performed in any suitable order, concurrently, and when  
the program guide is prefetching data.

35 At step 620, the program guide displays the  
program listings data for the user on user television  
equipment 22. This may involve, for example,  
displaying current program listings data obtained from  
40 25 the continuous data stream of current data for a given  
channel in a FLIP display in response to a user tuning  
to that channel (step 625). If, for example, the user  
indicates a desire to browse through additional program  
listings for the current time or for a time period in  
45 30 the next few hours, the program guide may display  
program listings obtained from the current data stream  
in a BROWSE display. If the user indicates a desire to  
browse through additional program listings for a time  
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slot that is more than a few hours in the future, the program guide may display program listings obtained from program guide server 25 in the BROWSE display at step 630. Program listings obtained from the

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continuous data stream may also be displayed in a program listings screen (step 633). Program listings obtained from program guide server 25 (e.g., the program listings for a particular category of programs more than a few hours in the future) may be displayed by the program guide in a suitable program listings by category screen (step 635).

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At step 630, the program guide may obtain additional program information from program guide server 25 for a program whose title and other basic

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information were contained in a program listing obtained from the continuous data stream. This step may be performed by the program guide, for example, when a user selects a program listing within a program listings screen. The additional program information obtained from program guide server 25 may be displayed by the program guide for the user on user television equipment 22 at step 650.

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FIG. 18 shows illustrative steps involved in using the program guide to perform real-time actions that are associated with a showing of a program. The program guide may have provided a user with an opportunity to access a program guide function that involves performing a real-time action associated with a showing of a program or with a program series or other program grouping (e.g., mini-series, orderable package, etc.). Examples of such functions and actions include recording (the real-time action is the act of starting the recording of the program), setting

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10 reminders (the real-time action is the display of the reminder just before the desired program is aired),  
15 advance pay-per-view purchasing (the real-time action is the authorization of the purchased program when that  
5 program is aired), parental control (the real-time action is the locking or unlocking of a particular program when that program is aired), etc. The program guide may obtain a unique identifier for a showing of a  
20 program, or for a series, mini-series, orderable  
25 package or other program grouping, at step 700. As indicated by steps 705 and 710, the unique identifier may be obtained from the continuous data stream or from program guide server 25, respectively. The unique  
30 identifier may, for example, be obtained by the program  
35 guide when program listings information for a program is obtained.

30 At step 720, the unique identifier and the associated real-time action are stored by the program guide (e.g., in a list of upcoming actions). Unique  
20 identifiers for showings of programs or for program groupings may be transmitted by television distribution facility 16 as part of the continuous data stream. The program guide may monitor the continuous data stream for the unique identifiers that have been stored by the  
40 program guide in user television equipment 22 (e.g., in the form of the list of upcoming actions or other suitable data structure) at step 730. At step 740, the program guide performs an associated real-time action when a unique identifier is detected in the continuous  
45 30 data stream. This may include, for example, displaying a program reminder, authorizing the viewing of a pay-per-view program, notifying a user that a pay-per-view  
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10 has started, recording a program, locking a program and requesting a parental control code, etc.

15 FIGS. 19a-19c show illustrative data flow diagrams of three embodiments of the interactive  
5 program guide system of the present invention in which the program guide performs real-time actions based on identifiers transmitted in a continuous data stream.

20 In the data flow diagram of FIG. 19a, identifiers and current program guide data are obtained by the program  
10 guide from a continuous data stream transmitted by distribution equipment 21. The program guide also obtains program guide data by generating requests that are processed by program guide server 25. In this approach, the program guide does not store program

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25 15 guide data except for the brief time in which the program guide uses the data for display or for a prefetch. In this approach, the memory requirements of user television equipment 22 may be minimized because no database of program guide data is stored.

30 20 In the arrangement of FIG. 19b, the program guide obtains program guide data and identifiers from distribution equipment 21. The identifiers are transmitted by distribution equipment 21 in a continuous data stream. Program guide data, however,

35 25 may be obtained by the program guide from a data stream transmitted by distribution equipment 21, or from program guide server 25. Program guide data may be transmitted by distribution equipment 21 in a continuous data stream, periodically, or using a  
40 25 30 suitable hybrid approach. For example, often-needed data may be transmitted continuously and less urgent data transmitted periodically. Alternatively, often needed data may be transmitted periodically with a high

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frequency, and less urgent data may be transmitted  
10 periodically with a low frequency. In still another  
suitable approach, all data may be transmitted  
continuously but the cycle rate of some data may vary  
5 based on how often the data is needed.

15 Program guide data obtained either from a  
data stream provided by distribution equipment 21 or  
from program guide server 25 is stored by the program  
guide in program guide database 79. With this  
20 approach, user television equipment 22 (FIG. 1) may  
have memory for storing database 79. Database 79 would  
preferably contain program guide data for the current  
time slot and program guide data that is needed often  
25 by the program guide. If desired, program guide server  
10 25 may be used by the program guide as, for example, a  
source of data supplemental to the data stored in  
30 database 79. This approach may require less memory  
than a system in which a significant portion of the  
available program guide data is stored by the program  
20 guide. In addition, the maintenance of a relatively  
35 small database of often needed data may minimize the  
latency of the system.

40 FIG. 19c shows an illustrative data flow  
diagram for a further embodiment of the present  
45 invention. In this embodiment, the program guide  
obtains program guide data only from program guide  
server 25. Identifiers are obtained from a continuous  
50 data stream transmitted by distribution equipment 21.  
This approach may allow program guide server 25 to bear  
30 all of the processing and storage burden associated  
with maintaining a database of program guide data,  
while still allowing for the program guide to perform

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real-time actions at the appropriate time when there is  
a schedule change.

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The foregoing is merely illustrative of the principles of this invention and various modifications can be made by those skilled in the art without departing from the scope and spirit of the invention.

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What is claimed is:

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1. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is current program guide data, the system comprising:

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a continuous data stream processor configured to select the current program guide data for inclusion in a continuous data stream;

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distribution equipment configured to distribute the current program guide data selected by the continuous data stream processor in the continuous data stream to user television equipment;

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a program guide server; and  
an interactive television program guide implemented on the user television equipment configured to obtain the current program guide data from the continuous data stream and to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

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2. The system defined in claim 1 wherein:  
the current program guide data comprises one or more unique identifiers; and

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the interactive television program guide is configured to perform a real-time action when a particular unique identifier is in the continuous data stream.

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3. The system defined in claim 2 wherein:  
the real-time action comprises displaying a program reminder for a program; and

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the interactive television program guide  
is configured to display the program reminder for the  
program when a particular unique identifier is in the  
continuous data stream.

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4. The system defined in claim 2 wherein:  
the real-time action comprises  
displaying a program reminder; and

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the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the reminder is  
displayed by the program guide.

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5. The system defined in claim 2 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and  
the interactive television program guide  
is configured to authorize the viewing of a pay-per-  
view program when a particular unique identifier is in  
the continuous data stream.

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6. The system defined in claim 2 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the viewing of the  
pay-per-view program is authorized by the program  
guide.

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7. The system defined in claim 2 wherein:  
the real-time action comprises recording  
a program; and

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the interactive television program guide is configured to record a program when a particular unique identifier is in the continuous data stream.

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8. The system defined in claim 2 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the interactive television program guide  
is configured to lock a program and prompt the user for  
a control code when a particular identifier is in the  
continuous data stream.

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9. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises displaying a program reminder for a program of a program grouping; and

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the interactive television program guide is configured to display the program reminder for the program of a program grouping when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

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10. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises displaying a program reminder for a program of a program grouping; and

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the interactive television program guide  
is configured to prefetch current program guide data

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from the continuous data stream when the reminder is displayed by the program guide.

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11. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing the viewing of a pay-per-view program of a  
program grouping; and  
the interactive television program guide  
is configured to authorize the viewing of a pay-per-  
view program of a program grouping when a particular  
unique identifier is in the continuous data stream.

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12. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program of a  
program grouping; and  
the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the viewing of the  
pay-per-view program of a program grouping is  
authorized by the program guide.

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13. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises recording  
a program of a program grouping; and  
the interactive television program guide  
is configured to record a program of a program grouping

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when a particular unique identifier is in the continuous data stream.

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14. The system defined in claim 2 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and  
the interactive television program guide  
is configured to lock a program of a program grouping  
and prompt the user for a control code when a  
particular identifier is in the continuous data stream.

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15. The system defined in claim 1 wherein  
the continuous data stream processor obtains current  
program guide data from the program guide server.

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16. The system defined in claim 1 wherein:  
the continuous data stream processor  
prioritizes the current program guide data; and  
the distribution equipment cycles the  
current program guide data in the continuous data  
stream according to how the current program guide data  
was prioritized by the continuous data stream  
processor.

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17. The system defined in claim 1 wherein  
the program guide processes the current program guide  
data in real-time and with no data caching.

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18. The system defined in claim 1 wherein  
the user television equipment comprises hardware

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filtering circuitry configured to filter current program guide data from the continuous data stream based on a tag.

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19. The system defined in claim 1 wherein the program guide prefetches current program guide data from the continuous data stream.

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20. The system defined in claim 1 wherein the program guide prefetches program guide data from the program guide server.

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21. The system defined in claim 1 wherein:  
the interactive television program guide is configured to invoke a remote procedure call on the program guide server; and  
the program guide server is configured to provide the program guide data to the interactive television program guide in response to the remote procedure call being invoked by the interactive television program guide.

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22. The system defined in claim 1 wherein:  
the interactive television program guide is configured to obtain program guide data from the program guide server using an object request broker;  
and  
the program guide server is configured to provide program guide data to the interactive television program guide using the object request broker.

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23. The system defined in claim 1 wherein:  
the interactive television program guide  
is configured to obtain configuration information from  
the program guide server using one or more requests;  
and

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the program guide server is configured  
to store configuration information and to provide the  
configuration information to the interactive television  
program guide in response to the one or more requests.

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24. The system defined in claim 1 wherein:  
the interactive television program guide  
is configured to obtain user settings from the program  
guide server using one or more requests; and  
the program guide server is configured  
to store user settings and to provide the user settings  
to the program guide in response to the one or more  
requests.

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25. The system defined in claim 1 wherein:  
the current program guide data has one  
or more types; and  
the program guide is configured to  
recognize the type of current program guide data  
carried in the continuous data stream and to obtain  
current program guide data from the continuous data  
stream when the current program guide data in the  
continuous data stream is a particular type.

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26. The system defined in claim 1 wherein:  
the current program guide data has one  
or more types; and

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the program guide is configured to recognize the type of current program guide data carried in the continuous data stream and to obtain program guide data from the program guide server when the current program guide data in the continuous data stream is not a particular type.

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27. The system defined in claim 1 wherein the program guide is configured to obtain program guide data for a program of a particular category from the program guide server.

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28. The system defined in claim 1 wherein the program guide is configured to obtain current program guide data from the continuous data stream for a program of a particular category.

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29. The system defined in claim 1 wherein the program guide is configured to obtain current program guide data from the continuous data stream when a user indicates a desire to flip channels.

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30. The system defined in claim 1 wherein the program guide is configured to (1) obtain current program guide data from the continuous data stream when a user indicates a desire to browse program listings data in a current time slot, and to (2) obtain program guide data from the program guide server when the user indicates a desire to browse program listings data in time slots other than the current time slot.

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31. The system defined in claim 1 wherein:  
the program guide server is configured  
to provide program guide data to the continuous data  
stream processor; and

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the continuous data stream processor is  
configured to receive program guide data from the  
program guide server and to select current program  
guide data for inclusion in the continuous data stream  
from the program guide data provided by the program  
guide server.

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32. The system defined in claim 1 wherein:  
the program guide server is configured  
to continuously provide program guide data to the  
continuous data stream processor; and

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the continuous data stream processor is  
configured to continuously receive program guide data  
from the program guide server and to select current  
program guide data for inclusion in the continuous data  
stream from the program guide data provided by the  
program guide server.

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33. The system defined in claim 1 wherein:  
the program guide server is configured  
to periodically provide program guide data to the  
continuous data stream processor; and

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the continuous data stream processor is  
configured to periodically receive program guide data  
from the program guide server and to select current  
program guide data for inclusion in the continuous data  
stream from the program guide data provided by the  
program guide server.

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34. The system defined in claim 1 wherein:  
the program guide server is configured  
to poll the continuous data stream processor and  
provide program guide data to the continuous data  
stream processor; and

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the continuous data stream processor is  
configured to receive program guide data from the  
program guide server and to select current program  
guide data for inclusion in the continuous data stream  
from the program guide data provided by the program  
guide server.

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35. The system defined in claim 1 wherein:  
the program guide server is configured  
to provide program guide data to the continuous data  
stream processor in response to requests generated by  
the continuous data stream processor; and

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the continuous data stream processor is  
configured to generate one or more requests for program  
guide data, provide the one or more requests to the  
program guide server, receive program guide data from  
the program guide server, and to select current program  
guide data for inclusion in the continuous data stream  
from the program guide data provided by the program  
guide server.

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40. The system defined in claim 1 wherein:  
the system further comprises a main  
facility configured to provide a continuous data stream  
of current program guide data; and  
the continuous data stream distributed  
by the distribution equipment is the continuous data  
stream provided by the main facility.

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37. The system defined in claim 1 wherein the continuous data stream processor is configured to select current program guide data from programmer provided in-band information.

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38. The system defined in claim 1 wherein the continuous data stream processor is configured to localize program guide data provided by a main facility and to select the current program guide data for inclusion in a continuous data stream from the program guide data that is localized by the continuous data stream processor.

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39. The system defined in claim 1 wherein: the program guide server is configured to localize program guide data provided by a main facility; and

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the distribution equipment is configured to distribute the program guide data that is localized by the program guide server.

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40. The system defined in claim 1 wherein: the continuous data stream processor is configured to select the current program guide data for inclusion in a plurality of continuous data streams wherein each continuous data stream of the plurality of continuous data streams carries current program guide data for a particular program guide display screen;

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45. the distribution equipment is configured to distribute the plurality of continuous data streams to the user television equipment; and

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50. the interactive television program guide is configured to obtain current program guide data for

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a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen.

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41. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

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a continuous data stream processor configured to select one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

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distribution equipment configured to distribute the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream; and

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an interactive television program guide implemented on the user television equipment configured to obtain the one or more unique identifiers selected by the continuous data stream processor and to perform a real-time action when a particular unique identifier is in the continuous data stream.

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42. The system defined in claim 41 wherein:  
the real-time action comprises  
displaying a program reminder for a program; and  
the interactive television program guide is configured to display the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

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43. The system defined in claim 41 wherein:  
the real-time action comprises  
displaying a program reminder; and  
the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the reminder is  
displayed by the program guide.

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44. The system defined in claim 41 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and  
the interactive television program guide  
is configured to authorize the viewing of a pay-per-  
view program when a particular unique identifier is in  
the continuous data stream.

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45. The system defined in claim 41 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the viewing of the  
pay-per-view program is authorized by the program  
guide.

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46. The system defined in claim 41 wherein:  
the real-time action comprises recording  
a program; and  
the interactive television program guide  
is configured to record a program when a particular  
unique identifier is in the continuous data stream.

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47. The system defined in claim 41 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the interactive television program guide  
is configured to lock a program and prompt the user for  
a control code when a particular identifier is in the  
continuous data stream.

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48. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and  
the interactive television program guide  
is configured to display the program reminder for the  
program of a program grouping when a particular unique  
identifier of the one or more unique identifiers is in  
the continuous data stream.

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49. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and

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the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the reminder is  
displayed by the program guide.

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50. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing the viewing of a pay-per-view program of a  
program grouping; and

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the interactive television program guide  
is configured to authorize the viewing of a pay-per-  
view program of a program grouping when a particular  
unique identifier is in the continuous data stream.

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51. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program of a  
program grouping; and

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the interactive television program guide  
is configured to prefetch current program guide data  
from the continuous data stream when the viewing of the  
pay-per-view program of a program grouping is  
authorized by the program guide.

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52. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises recording  
a program of a program grouping; and  
the interactive television program guide  
is configured to record a program of a program grouping  
when a particular unique identifier is in the  
continuous data stream.

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53. The system defined in claim 41 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and  
the interactive television program guide  
is configured to lock a program of a program grouping  
and prompt the user for a control code when a  
particular identifier is in the continuous data stream.

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54. An interactive television program guide  
system in which program guide data is provided and  
wherein at least some of the program guide data is  
current program guide data and one or more unique  
identifiers, the system comprising:  
a continuous data stream processor  
configured to select the current program guide data and  
one or more of the one or more unique identifiers for  
inclusion in a continuous data stream;  
distribution equipment configured to  
distribute the current program guide data and one or  
more unique identifiers selected by the continuous data  
stream processor in the continuous data stream to the  
user television equipment;  
a program guide server; and  
an interactive television program guide  
implemented on user television equipment configured:  
to obtain one or more of the one or  
more unique identifiers from the continuous data  
stream;  
to obtain the current program guide  
data from the continuous data stream and to store at

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least some of the current program guide data in a database stored in the user television equipment; and to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

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55. The system defined in claim 54 wherein the interactive television program guide is configured to store at least some of the program guide data obtained from the program guide server in the database.

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56. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

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a continuous data stream processor configured to select one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

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distribution equipment configured to distribute the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream;

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a program guide server; and

an interactive television program guide implemented on user television equipment configured to obtain the one or more unique identifiers from the continuous data stream and to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

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10               57. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data, the system comprising:

15               means for selecting current program guide data for inclusion in a continuous data stream; means for distributing the current program guide data selected by the means for selecting to the user television equipment in the continuous data stream;

20               means for providing program guide data using a client-server based approach; and

25               means for obtaining current program guide data from the continuous data stream and to obtain program guide data from the means for providing program guide data using the interactive television program guide implemented on the user television equipment in response to requests generated by the interactive television program guide.

30               58. The system defined in claim 57 wherein: the current program guide data comprises one or more unique identifiers; and

35               the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for performing a real-time action when a particular unique identifier is in the continuous data stream.

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59. The system defined in claim 58 wherein:  
the real-time action comprises  
displaying a program reminder for a program; and  
the means for performing a real-time  
action comprises means for displaying the program  
reminder for the program when a particular unique  
identifier of the one or more unique identifiers is in  
the continuous data stream.

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60. The system defined in claim 58 wherein:  
the real-time action comprises  
displaying a program reminder; and  
the means for performing a real-time  
action comprises means for prefetching the current  
program guide data from the continuous data stream when  
the reminder is displayed by the means for performing a  
real-time action.

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61. The system defined in claim 58 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and  
the means for performing a real-time  
action comprises means for authorizing the viewing of a  
pay-per-view program when a particular unique  
identifier is in the continuous data stream.

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62. The system defined in claim 58 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the

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viewing of the pay-per-view program is authorized by  
the means for performing a real-time action.

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63. The system defined in claim 58 wherein:  
the real-time action comprises recording  
a program; and  
the means for performing a real-time  
action comprises means for recording a program when a  
particular unique identifier is in the continuous data  
stream.

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64. The system defined in claim 58 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the means for performing a real-time  
action comprises means for locking a program and  
prompting the user for a control code when a particular  
identifier is in the continuous data stream.

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65. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and  
the means for performing a real-time  
action comprises means for displaying the program  
reminder for the program of a program grouping when a  
particular unique identifier is in the continuous data  
stream.

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66. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and  
the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the  
reminder is displayed by the means for performing a  
real-time action.

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67. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing the viewing of a pay-per-view program of a  
program grouping; and  
the means for performing a real-time  
action comprises means for authorizing the viewing of a  
pay-per-view program of a program grouping when a  
particular unique identifier is in the continuous data  
stream.

68. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program of a  
program grouping; and  
the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the

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10 viewing of the pay-per-view program of a program grouping is authorized by the means for performing a real-time action.

15 69. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises recording  
a program of a program grouping; and  
20 the means for performing a real-time  
action comprises means for recording a program of a  
program grouping when a particular unique identifier is  
in the continuous data stream.

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30 70. The system defined in claim 58 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and  
35 the means for performing a real-time  
action comprises means for locking a program of a  
program grouping and prompting the user for a control  
code when a particular identifier is in the continuous  
40 data stream.

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71. The system defined in claim 57 wherein  
the means for selecting obtains current program guide  
data from the means for providing program guide data  
using a client-server based approach.

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72. The system defined in claim 57 wherein:  
the means for selecting comprises means  
for prioritizing the current program guide data; and  
the means for distributing comprises  
means for cycling the current program guide data in the  
continuous data stream according to how the current  
program guide data was prioritized by the means for  
selecting.

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73. The system defined in claim 57 wherein  
the means for obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises means for processing the  
current program guide data in real-time and with no  
data caching.

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74. The system defined in claim 57 wherein  
the user television equipment comprises means for  
filtering current program guide data from the  
continuous data stream based on a tag.

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75. The system defined in claim 57 wherein  
the means for obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises means for prefetching current  
program guide data from the continuous data stream.

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76. The system defined in claim 57 wherein  
the means for obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises means for prefetching program  
guide data from the means for providing program guide  
data using a client-server based approach.

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77. The system defined in claim 57 wherein:  
the means for obtaining current program  
guide data and program guide data using the interactive  
television program guide comprises means for invoking a  
remote procedure call on the means for providing  
program guide data using a client-server based  
approach; and

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the means providing program guide data  
using a client-server based approach comprises means  
for providing the program guide data to the means for  
obtaining current program guide data and program guide  
data using the interactive television program guide in  
response to the remote procedure call being invoked.

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78. The system defined in claim 57 wherein:  
the means for obtaining current program  
guide data and program guide data using the interactive  
television program guide comprises means for using an  
object request broker to obtain program guide data from  
the means for providing program guide data using a  
client-server bases approach; and

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the means for providing program guide  
data using a client-server based approach comprises  
means for providing program guide data to the means for  
obtaining current program guide data and program guide  
data using the interactive television program guide  
using the object request broker.

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79. The system defined in claim 57 wherein:  
the means for obtaining current program  
guide data and program guide data using the interactive  
television program guide comprises means for obtaining

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configuration information from the means for providing  
program guide data using a client-server based approach  
using one or more requests; and

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the means for providing program guide data  
using a client-server based approach comprises means  
for storing configuration information and providing the  
configuration information to the means for obtaining  
current program guide data and program guide data using  
the interactive television program guide in response to  
the one or more requests.

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80. The system defined in claim 57 wherein:  
the means for obtaining current program  
guide data and program guide data using the interactive  
television program guide comprises means for obtaining  
user settings from the means for providing program  
guide data using a client-server based approach using  
one or more requests; and

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the means for providing program guide  
data using a client-server based approach comprises  
means for storing user settings and for providing the  
user settings to the means for obtaining current  
program guide data and program guide data using the  
interactive television program guide in response to the  
one or more requests.

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81. The system defined in claim 57 wherein:  
the current program guide data has one  
or more types; and

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the means for obtaining current program  
guide data and program guide data using the interactive  
television program guide comprises means for  
recognizing the type of current program guide data

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carried in the continuous data stream and for obtaining current program guide data from the continuous data stream when the current program guide data in the continuous data stream is a particular type.

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82. The system defined in claim 57 wherein:  
the current program guide data has one  
or more types; and

20

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for recognizing the type of current program guide data carried in the continuous data stream and for obtaining program guide data from the means for providing program guide data using a client-server based approach when the current program guide data in the continuous data stream is not a particular type.

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83. The system defined in claim 57 wherein  
the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining program guide data for a program of a particular category from the means for providing program guide data using a client-server based approach.

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84. The system defined in claim 57 wherein  
the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining current program guide data from the continuous data stream for a program of a particular category.

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85. The system defined in claim 57 wherein  
the means for obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises means for obtaining current  
program guide data from the continuous data stream when  
a user indicates a desire to flip channels.

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86. The system defined in claim 57 wherein  
the means for obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises:

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means for obtaining current program  
guide data from the continuous data stream when a user  
indicates a desire to browse program listings data in a  
current time slot; and

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means for obtaining program guide data  
from the means for providing program guide data using a  
client-server based approach when the user indicates a  
desire to browse program listings data in time slots  
other than the current time slot.

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87. The system defined in claim 57 wherein:  
the means for providing program guide  
data using a client-server based approach comprises  
means for providing program guide data to the means for  
selecting current program guide data; and

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the means for selecting current program  
guide data comprises means for receiving program guide  
data from the means for providing program guide data  
using a client-server based approach and for selecting  
current program guide data for inclusion in the  
continuous data stream from the program guide data

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provided by the means for providing program guide data using a client-server based approach.

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88. The system defined in claim 57 wherein:  
the means for providing program guide  
data using a client-server based approach comprises  
means for continuously providing program guide data to  
the means for selecting current program guide data; and  
the means for selecting current program  
guide data comprises means for continuously receiving  
program guide data from the means for providing program  
guide data using a client-server based approach and for  
selecting current program guide data for inclusion in  
the continuous data stream from the program guide data  
provided by the means for providing program guide data  
using a client-server based approach.

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89. The system defined in claim 57 wherein:  
the means for providing program guide  
data using a client-server based approach comprises  
means for periodically providing program guide data to  
the means for selecting current program guide data; and  
the means for selecting current program  
guide data comprises means for periodically receiving  
program guide data from the program guide server and  
for selecting current program guide data for inclusion  
in the continuous data stream from the program guide  
data provided by the means for providing program guide  
data using a client-server based approach.

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90. The system defined in claim 57 wherein:  
the means for providing program guide  
data using a client-server based approach comprises

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means for polling the means for selecting current program guide data and providing program guide data to the means for selecting current program guide data; and the means for selecting current program guide data comprises means for receiving program guide data from the means for providing program guide data using a client-server based approach and for selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

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91. The system defined in claim 57 wherein:  
the means for providing program guide data using a client-server based approach comprises means for providing program guide data to the means for selecting current program guide data in response to requests generated by the means for selecting current program guide data; and

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the means for selecting current program guide data comprises means for generating one or more requests for program guide data, providing the one or more requests to the means for providing program guide data using a client-server based approach, receiving program guide data from the means for providing program guide data using a client-server based approach, and selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

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92. The system defined in claim 57 wherein:  
the system further comprises means for  
providing a continuous data stream of current program  
guide data to the means for selecting current program  
guide data; and

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the continuous data stream distributed  
by the means for distributing is the continuous data  
stream provided by the means for providing a continuous  
data stream of current program guide data to the means  
for selecting current program guide data.

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93. The system defined in claim 57 wherein  
the means for selecting current program guide data is  
configured to select current program guide data from  
programmer provided in-band information.

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94. The system defined in claim 57 wherein  
the means for selecting current program guide data  
comprises means for localizing program guide data  
provided by a means for providing a continuous data  
stream of current program guide data and for selecting  
the current program guide data for inclusion in a  
continuous data stream from the program guide data that  
is localized by the means for selecting current program  
guide data.

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95. The system defined in claim 57 wherein:  
the means for selecting current program  
guide data is configured to select the current program  
guide data for inclusion in a plurality of continuous  
data streams wherein each continuous data stream of the  
plurality of continuous data streams carries current

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program guide data for a particular program guide display screen;

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the means for distributing comprises means for distributing the plurality of continuous data streams to the means for obtaining current program guide data and program guide data using the interactive television program guide; and

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the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining current program guide data for a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen.

25

96. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

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means for selecting one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

35

means for distributing the one or more unique identifiers selected by the means for selecting to the user television equipment in the continuous data stream; and

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means using the interactive television program guide for obtaining the one or more unique identifiers selected by the means for selecting and for performing a real-time action when a particular unique identifier is in the continuous data stream.

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97. The system defined in claim 96 wherein:  
the real-time action comprises  
displaying a program reminder for a program; and  
the means for performing a real-time  
action comprises means for displaying the program  
reminder for the program when a particular unique  
identifier of the one or more unique identifiers is in  
the continuous data stream.

15

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98. The system defined in claim 96 wherein:  
the real-time action comprises  
displaying a program reminder; and  
the means for performing a real-time  
action comprises means for prefetching the current  
program guide data from the continuous data stream when  
the reminder is displayed by the means for performing a  
real-time action.

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99. The system defined in claim 96 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and  
the means for performing a real-time  
action comprises means for authorizing the viewing of a  
pay-per-view program when a particular unique  
identifier is in the continuous data stream.

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45

100. The system defined in claim 96 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the

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viewing of the pay-per-view program is authorized by  
the means for performing a real-time action.

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101. The system defined in claim 96 wherein:  
the real-time action comprises recording  
a program; and

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the means for performing a real-time  
action comprises means for recording a program when a  
particular unique identifier is in the continuous data  
stream.

25

102. The system defined in claim 96 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the means for performing a real-time  
action comprises means for locking a program and  
prompting the user for a control code when a particular  
identifier is in the continuous data stream.

30

103. The system defined in claim 96 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

35

the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and

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the means for performing a real-time  
action comprises means for displaying the program  
reminder for the program of a program grouping when a  
particular unique identifier is in the continuous data  
stream.

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104. The system defined in claim 96 wherein:  
10 one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and  
15 the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the  
reminder is displayed by the means for performing a  
real-time action.
105. The system defined in claim 96 wherein:  
20 one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing the viewing of a pay-per-view program of a  
program grouping; and  
25 the means for performing a real-time  
action comprises means for authorizing the viewing of a  
pay-per-view program of a program grouping when a  
particular unique identifier is in the continuous data  
stream.
106. The system defined in claim 96 wherein:  
30 one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program of a  
program grouping; and  
35 the means for performing a real-time  
action comprises means for prefetching current program  
guide data from the continuous data stream when the  
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10 viewing of the pay-per-view program of a program grouping is authorized by the means for performing a real-time action.

15 107. The system defined in claim 96 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises recording  
a program of a program grouping; and  
20 the means for performing a real-time  
action comprises means for recording a program of a  
program grouping when a particular unique identifier is  
in the continuous data stream.  
25

30 108. The system defined in claim 96 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and  
35 the means for performing a real-time  
action comprises means for locking a program of a  
program grouping and prompting the user for a control  
code when a particular identifier is in the continuous  
40 data stream.

45 109. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data and one or more unique identifiers, the system comprising:  
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10 means for selecting current program  
guide data and one or more of the one or more unique  
identifiers for inclusion in the continuous data  
stream;

15 means for distributing the current  
program guide data and one or more unique identifiers  
selected by the means for selecting in the continuous  
data stream to the user television equipment;

20 means for providing program guide data  
using a client-server based approach; and

means using the interactive television  
program guide to obtain:

25 one or more unique identifiers from  
the continuous data stream using the interactive  
television program guide;

30 current program guide data from a  
data stream and to store at least some of the current  
program guide data in a database stored in the user  
television equipment; and

35 program guide data from the means  
for providing in response to requests generated by the  
interactive television program guide.

40 110. The system defined in claim 109 wherein  
the means for obtaining comprises means for storing at  
least some of the program guide data in the database.

45 111. An interactive television program guide  
system in which program guide data is provided to an  
interactive television program guide implemented on  
user television equipment wherein at least some of the  
program guide data is one or more unique identifiers,  
50 the system comprising:

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means for selecting one or more of the  
one or more unique identifiers for inclusion in a  
continuous data stream;

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means for distributing the one or more  
unique identifiers selected by the means for selecting  
in the continuous data stream to the user television  
equipment;

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means for providing program guide data  
using a client-server based approach; and

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means for obtaining identifiers using  
the interactive television program guide from the  
continuous data stream and to obtain program guide data  
from the means for providing program guide data using a  
client-server based approach.

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112. A method in an interactive television  
program guide system in which program guide data is  
provided to an interactive television program guide  
implemented on user television equipment and wherein at  
least some of the program guide data is current program  
guide data, the method comprising:

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selecting current program guide data for  
inclusion in a continuous data stream using a  
continuous data stream processor;

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distributing the selected current  
program guide data to the user television equipment in  
the continuous data stream;

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providing program guide data using a  
program guide server; and

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obtaining current program guide data  
from the continuous data stream and from the program  
guide server using the interactive television program  
guide implemented on the user television equipment in

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response to requests generated by the interactive television program guide.

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113. The method defined in claim 112 wherein:  
the current program guide data comprises  
one or more unique identifiers; and  
the method further comprises performing  
a real-time action using the interactive television  
program guide when a particular unique identifier is in  
the continuous data stream.

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114. The method defined in claim 113 wherein:  
the real-time action comprises  
displaying a program reminder for a program; and  
the method further comprises using the  
interactive television program guide to display the  
program reminder for the program when a particular  
unique identifier of the one or more unique identifiers  
is in the continuous data stream.

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115. The method defined in claim 113 wherein:  
the real-time action comprises  
displaying a program reminder; and  
the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data  
stream when the reminder is displayed by the program  
guide.

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116. The method defined in claim 113 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and

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the method further comprises using the interactive television program guide to authorize the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

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117. The method defined in claim 113 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data  
stream when the viewing of the pay-per-view program is  
authorized by the program guide.

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118. The method defined in claim 113 wherein:  
the real-time action comprises recording  
a program; and  
the method further comprises using the  
interactive television program guide to record a  
program when a particular unique identifier is in the  
continuous data stream.

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119. The method defined in claim 113 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the method further comprises using the  
interactive television program guide to lock a program  
and prompt the user for a control code when a  
particular identifier is in the continuous data stream.

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120. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and

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the method further comprises using the  
interactive television program guide to display the  
program reminder for the program of a program grouping  
when a particular unique identifier of the one or more  
unique identifiers is in the continuous data stream.

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121. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

25

the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and

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the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data  
stream when the reminder is displayed by the program  
guide.

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122. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises  
authorizing the viewing of a pay-per-view program of a  
program grouping; and

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the method further comprises using the  
interactive television program guide to authorize the  
viewing of a pay-per-view program of a program grouping  
when a particular unique identifier is in the  
continuous data stream.

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123. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises  
authorizing a viewing of a pay-per-view-program of a  
program grouping; and

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the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data  
stream when the viewing of the pay-per-view program of  
a program grouping is authorized by the program guide.

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124. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises recording  
a program of a program grouping; and  
the method further comprises using the  
interactive television program guide to record a  
program of a program grouping when a particular unique  
identifier is in the continuous data stream.

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125. The method defined in claim 113 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;

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the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and

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the method further comprises using the  
interactive television program guide to lock a program  
of a program grouping and prompt the user for a control  
code when a particular identifier is in the continuous  
data stream.

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126. The method defined in claim 112 further comprising providing program guide data from the program guide server to the continuous data stream processor.

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127. The method defined in claim 112 further comprising:

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prioritizing the current program guide data; and cycling the current program guide data in the continuous data stream according to how the current program listings data was prioritized.

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128. The method defined in claim 112 further comprising processing the current program guide data in real-time and with no data caching using the interactive television program guide.

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129. The method defined in claim 112 further comprising filtering current program guide data from the continuous data stream based on a tag.

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130. The method defined in claim 112 further comprising prefetching current program guide data from the continuous data stream using the interactive television program guide.

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131. The method defined in claim 112 further comprising prefetching program guide data from the program guide server using the interactive television program guide.

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132. The method defined in claim 112 wherein:  
obtaining current program guide data and  
program guide data comprises invoking a remote  
procedure call on the program guide server using the  
interactive television program guide; and  
providing program guide data using a  
program guide server comprises providing program guide  
data in response to the remote procedure call being  
invoked on the program guide server.

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133. The method defined in claim 112 wherein:  
obtaining current program guide data and  
program guide data comprises using an object request  
broker to obtain program guide data from the program  
guide server; and  
providing program guide data using a  
program guide server comprises providing program guide  
data using the object request broker.

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134. The method defined in claim 112 wherein:  
obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises obtaining configuration  
information from the program guide server using one or  
more requests; and  
providing program guide data using a program  
guide server comprises storing configuration  
information and providing the configuration information  
to the interactive television program guide in response  
to the one or more requests.

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135. The method defined in claim 112 wherein:  
obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises obtaining user settings from  
the program guide server using one or more requests;  
and

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providing program guide data using a  
program guide server comprises storing user settings  
and providing the user settings to the interactive  
television program guide in response to the one or more  
requests.

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25 136. The method defined in claim 112 wherein:  
the current program guide data has one  
or more types; and

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obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises recognizing the type of current  
program guide data carried in the continuous data  
stream and obtaining current program guide data from  
the continuous data stream when the current program  
guide data in the continuous data stream is a  
particular type.

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137. The method defined in claim 112 wherein:  
the current program guide data has one  
or more types; and

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obtaining current program guide data and  
program guide data using the interactive television  
program guide comprises recognizing the type of current  
program guide data carried in the continuous data  
stream and obtaining program guide data from the  
program guide server when the current program guide

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data in the continuous data stream is not a particular type.

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138. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining program guide data for a program of a particular category from the program guide server.

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139. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining current program guide data from the continuous data stream for a program of a particular category.

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140. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining current program guide data from the continuous data stream when a user indicates a desire to flip channels.

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141. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises:

obtaining current program guide data from the continuous data stream when a user indicates a desire to browse program listings data in a current time slot; and

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obtaining program guide data from the program guide server when the user indicates a desire

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to browse program listings data in time slots other than the current time slot.

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142. The method defined in claim 112 wherein:  
the method further comprises providing  
program guide data from the program guide server to the  
continuous data stream processor; and  
selecting current program guide data for  
inclusion in the continuous data stream comprises  
selecting current program guide data from the program  
guide data provided by the program guide server.

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143. The system defined in claim 112 wherein:  
the method further comprises  
continuously providing program guide data from the  
program guide server to the continuous data stream  
processor; and  
selecting current program guide data for  
inclusion in the continuous data stream comprises  
selecting current program guide data from the program  
guide data provided by the program guide server.

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144. The method defined in claim 112 wherein:  
the method further comprises  
periodically providing program guide data from the  
program guide server to the continuous data stream  
processor; and  
selecting current program guide data for  
inclusion in the continuous data stream comprises  
selecting current program data from the program guide  
data provided by the program guide server.

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145. The method defined in claim 112 wherein:  
the method further comprises polling the  
continuous data stream processor and providing program  
guide data from the program guide server to the  
continuous data stream processor; and

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selecting current program guide data for  
inclusion in the continuous data stream comprises  
selecting current program data from the program guide  
data provided by the program guide server.

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146. The method defined in claim 112 wherein:  
the method further comprises:

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providing program guide data from the  
program guide server to the continuous data stream  
processor in response to requests generated by the  
continuous data stream processor;

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generating one or more requests for  
program guide data with the continuous data stream  
processor;

35

providing the one or more requests to  
the program guide server;

receiving program guide data from the  
program guide server; and

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wherein selecting current program guide  
data for inclusion in the continuous data stream  
comprises selecting current program data from the  
program guide data provided by the program guide  
server.

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147. The method defined in claim 112 wherein:  
the method further comprises providing a  
continuous data stream of current program guide data  
from a main facility; and

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distributing the continuous data stream  
comprises distributing the continuous data stream  
provided by the main facility.

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148. The method defined in claim 112 wherein  
selecting current program guide data comprises  
selecting current program guide data from programmer  
provided in-band information.

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149. The method defined in claim 112 further  
comprising localizing program guide data provided by a  
main facility using the continuous data stream  
processor; and

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wherein selecting the current program  
guide data for inclusion in a continuous data stream  
comprises selecting current program guide data from  
program guide data that is localized by the continuous  
data stream processor.

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150. The method defined in claim 112 wherein:  
the method further comprises localizing  
program guide data provided by a main facility using  
the program guide server; and  
wherein distributing current program  
guide data comprises distributing current program guide  
data that is localized by the program guide server.

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151. The method defined in claim 112 wherein:  
selecting program guide data comprises  
selecting current program guide data for inclusion in a  
plurality of continuous data streams wherein each  
continuous data stream of the plurality of continuous

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data streams carries current program guide data for a particular program guide display screen;

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distributing the current program guide data comprises distributing the plurality of continuous data streams to the user television equipment; and

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the method further comprises obtaining current program guide data for a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen using the interactive television program guide.

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152. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

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selecting one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream using a continuous data stream processor;

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distributing the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream;

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obtaining the one or more unique identifiers selected by the continuous data stream processor using the interactive television program guide; and

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performing a real-time action when a particular unique identifier is in the continuous data stream using the interactive television program guide.

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153. The method defined in claim 152 wherein:  
the real-time action comprises  
displaying a program reminder for a program; and  
the method further comprises using the  
interactive television program guide to display the  
program reminder for the program when a particular  
unique identifier of the one or more unique identifiers  
is in the continuous data stream.

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154. The method defined in claim 152 wherein:  
the real-time action comprises  
displaying a program reminder; and  
the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data  
stream when the reminder is displayed by the program  
guide.

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155. The method defined in claim 152 wherein:  
the real-time action comprises  
authorizing the viewing of a pay-per-view program; and  
the method further comprises using the  
interactive television program guide to authorize the  
viewing of a pay-per-view program when a particular  
unique identifier is in the continuous data stream.

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156. The method defined in claim 152 wherein:  
the real-time action comprises  
authorizing a viewing of a pay-per-view-program; and  
the method further comprises using the  
interactive television program guide to prefetch  
current program guide data from the continuous data

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stream when the viewing of the pay-per-view program is authorized by the program guide.

15

157. The method defined in claim 152 wherein:  
the real-time action comprises recording  
a program; and  
the method further comprises using the  
interactive television program guide to record a  
program when a particular unique identifier is in the  
continuous data stream.

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158. The method defined in claim 152 wherein:  
the real-time action comprises locking a  
program and prompting a user for a control code; and  
the method further comprises using the  
interactive television program guide to lock a program  
and prompt the user for a control code when a  
particular identifier is in the continuous data stream.

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159. The method defined in claim 152 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises  
displaying a program reminder for a program of a  
program grouping; and  
the method further comprises using the  
interactive television program guide to display the  
program reminder for the program of a program grouping  
when a particular unique identifier of the one or more  
unique identifiers is in the continuous data stream.

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10                 160. The method defined in claim 152 wherein:  
                       one or more of the one or more unique  
                       identifiers is a program grouping identifier;  
                       the real-time action comprises  
15                 displaying a program reminder for a program of a  
                       program grouping; and  
                       the method further comprises using the  
                       interactive television program guide to prefetch  
20                 current program guide data from the continuous data  
                       stream when the reminder is displayed by the program  
                       guide.

25                 161. The method defined in claim 152 wherein:  
                       one or more of the one or more unique  
                       identifiers is a program grouping identifier;  
                       the real-time action comprises  
30                 authorizing the viewing of a pay-per-view program of a  
                       program grouping; and  
                       the method further comprises using the  
                       interactive television program guide to authorize the  
                       viewing of a pay-per-view program of a program grouping  
35                 when a particular unique identifier is in the  
                       continuous data stream.

40                 162. The method defined in claim 152 wherein:  
                       one or more of the one or more unique  
                       identifiers is a program grouping identifier;  
                       the real-time action comprises  
45                 authorizing a viewing of a pay-per-view-program of a  
                       program grouping; and  
                       the method further comprises using the  
                       interactive television program guide to prefetch  
50                 current program guide data from the continuous data

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stream when the viewing of the pay-per-view program of a program grouping is authorized by the program guide.

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163. The method defined in claim 152 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises recording  
a program of a program grouping; and  
the method further comprises using the  
interactive television program guide to record a  
program of a program grouping when a particular unique  
identifier is in the continuous data stream.

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164. The method defined in claim 152 wherein:  
one or more of the one or more unique  
identifiers is a program grouping identifier;  
the real-time action comprises locking a  
program of a program grouping and prompting a user for  
a control code; and  
the method further comprises using the  
interactive television program guide to lock a program  
of a program grouping and prompt the user for a control  
code when a particular identifier is in the continuous  
data stream.

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165. A method in an interactive television  
program guide system in which program guide data is  
provided to an interactive television program guide  
implemented on user television equipment and wherein at  
least some of the program guide data is current program  
guide data and one or more unique identifiers, the  
method comprising:

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selecting current program guide data and one or more of the one or more unique identifiers for inclusion in the continuous data stream;

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distributing the selected current program guide data and one or more unique identifiers in the continuous data stream to the user television equipment;

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providing program guide data using a program guide server; and

25

using the interactive television program guide to obtain:

one or more unique identifiers from the continuous data stream using the interactive television program guide;

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current program guide data from the continuous data stream and to store at least some of the current program guide data in a database stored in the user television equipment; and

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program guide data from the program guide server in response to requests generated by the interactive television program guide.

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166. The method defined in claim 165 further comprising storing at least some of the program guide data in the database.

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167. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the method comprising:

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selecting one or more of the one or more unique identifiers for inclusion in a continuous data stream;

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distributing the selected one or more unique identifiers in the continuous data stream to the user television equipment;

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providing program guide data using a program guide server; and

obtaining identifiers from the continuous data stream and obtaining program guide data from the program guide server using the interactive television program guide.

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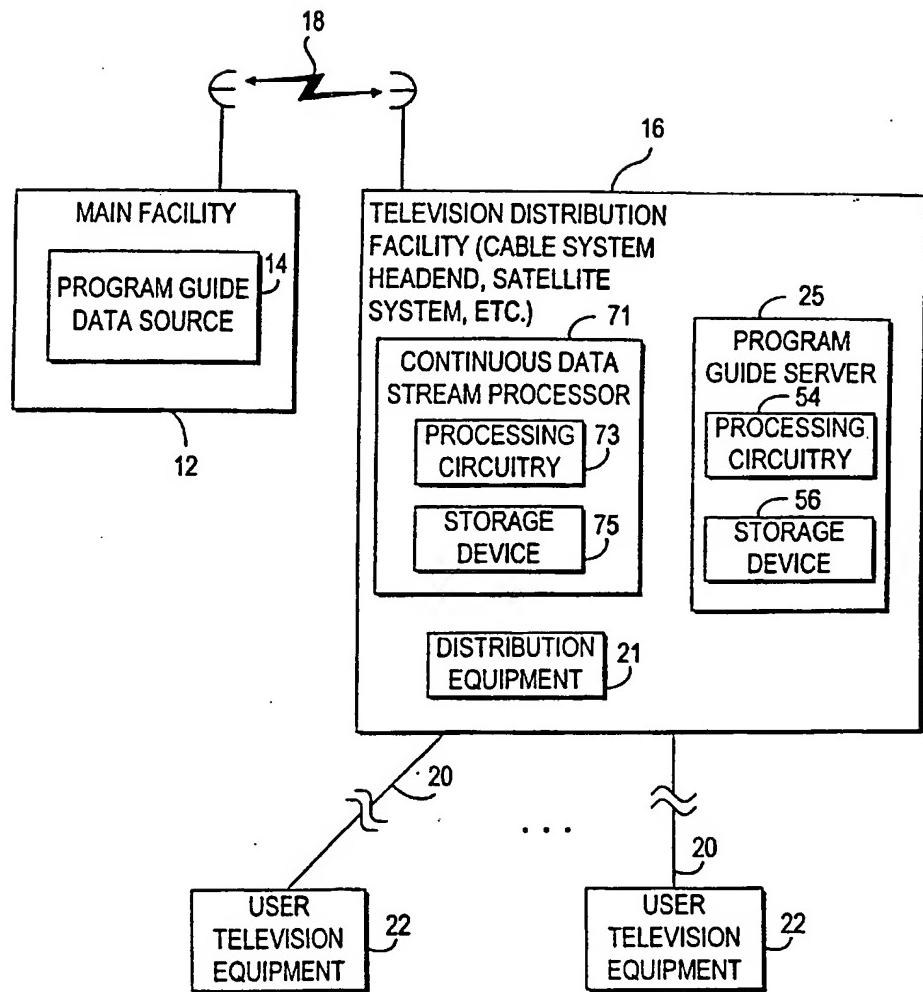


FIG. 1

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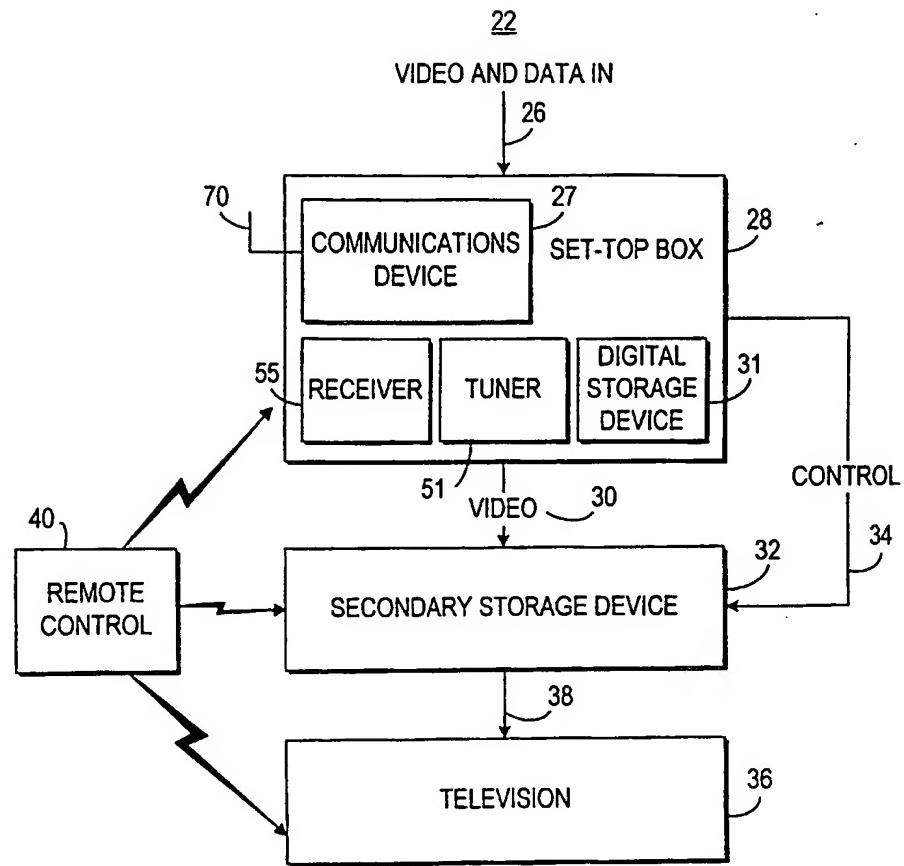


FIG. 2

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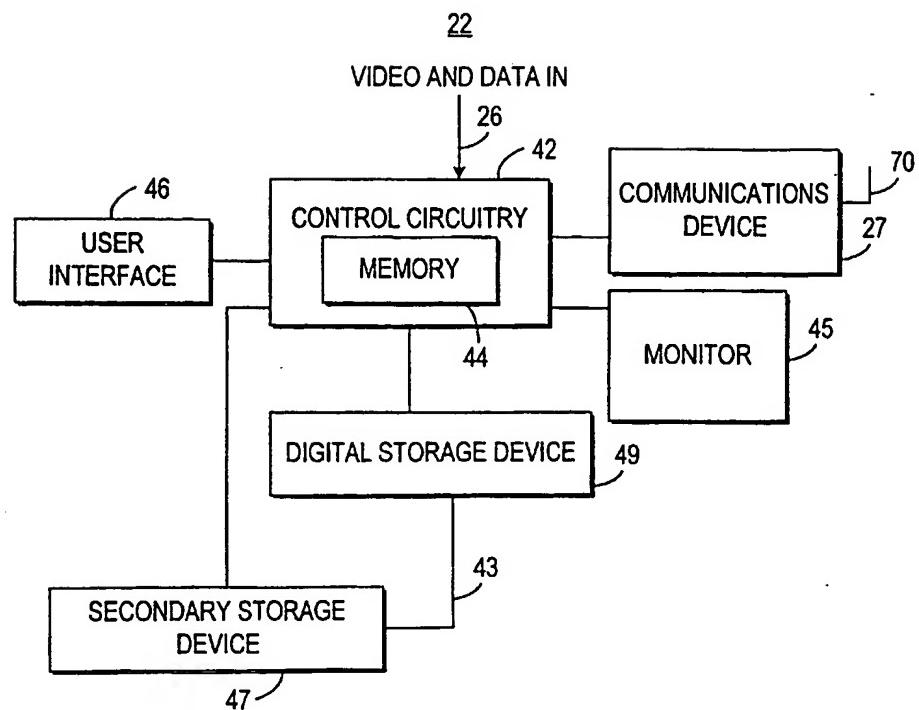


FIG. 3

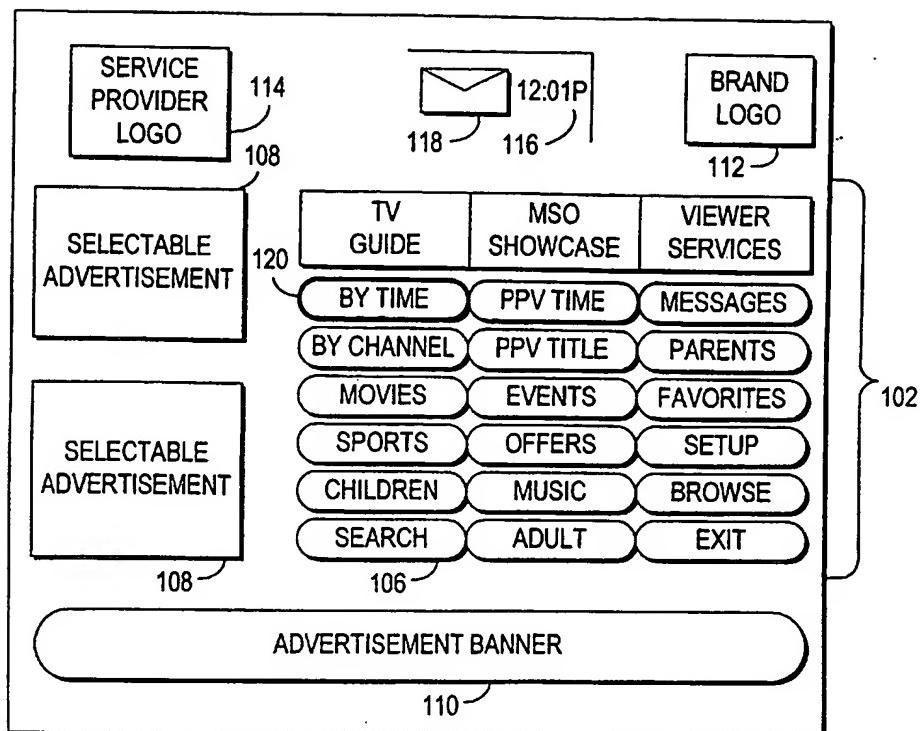
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FIG. 4

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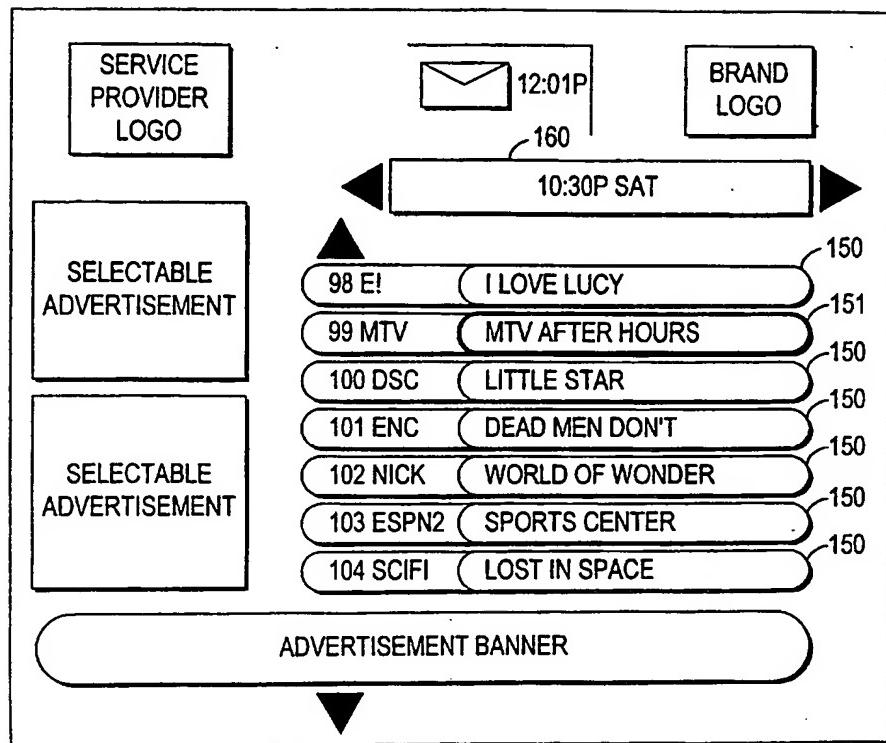
130

FIG. 5a

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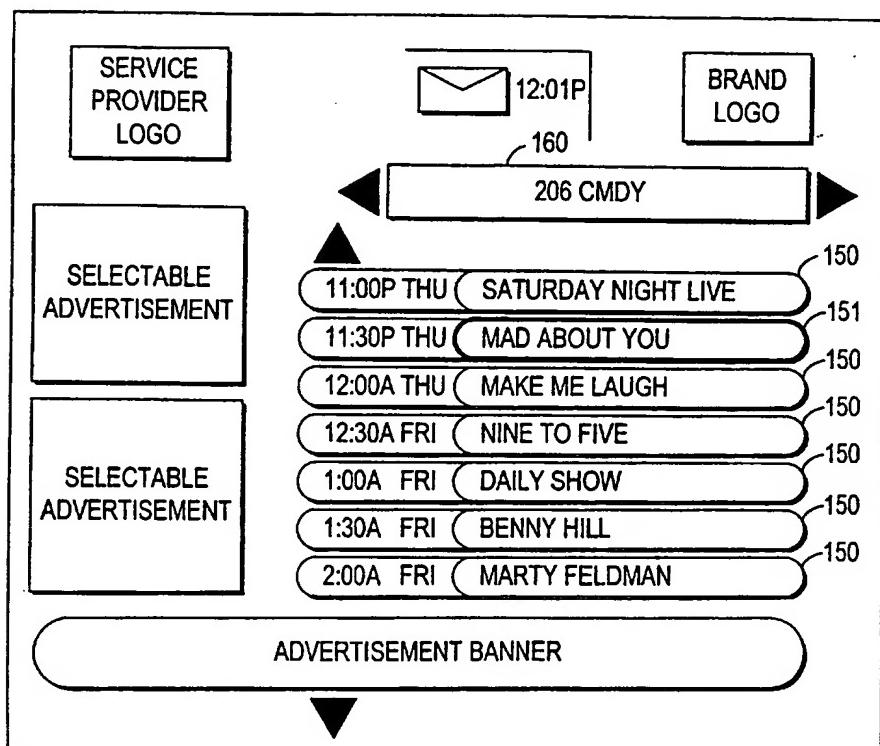
135

FIG. 5b

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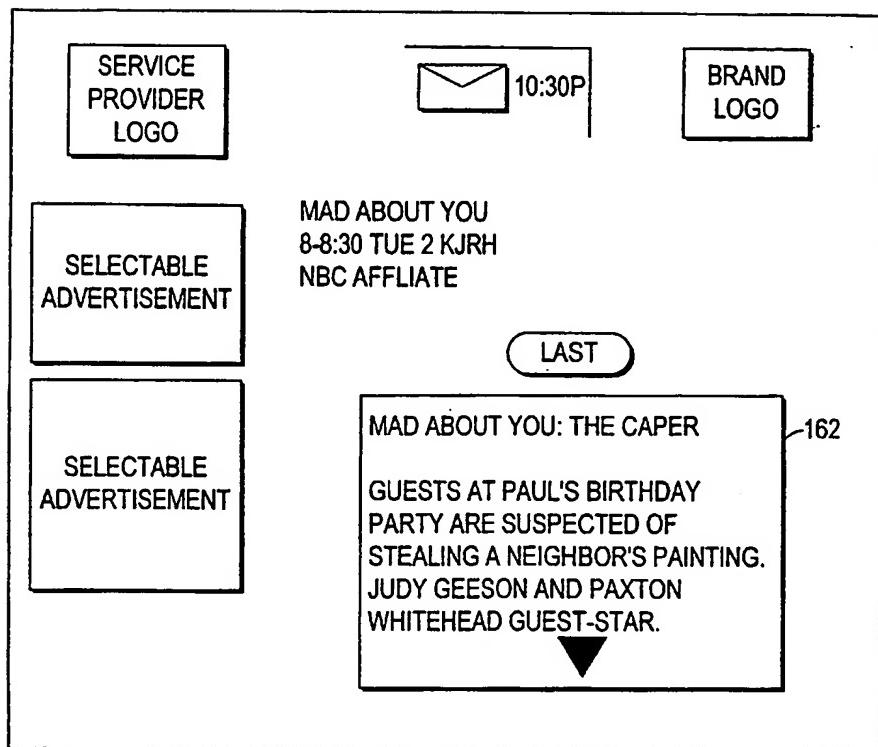
161

FIG. 6

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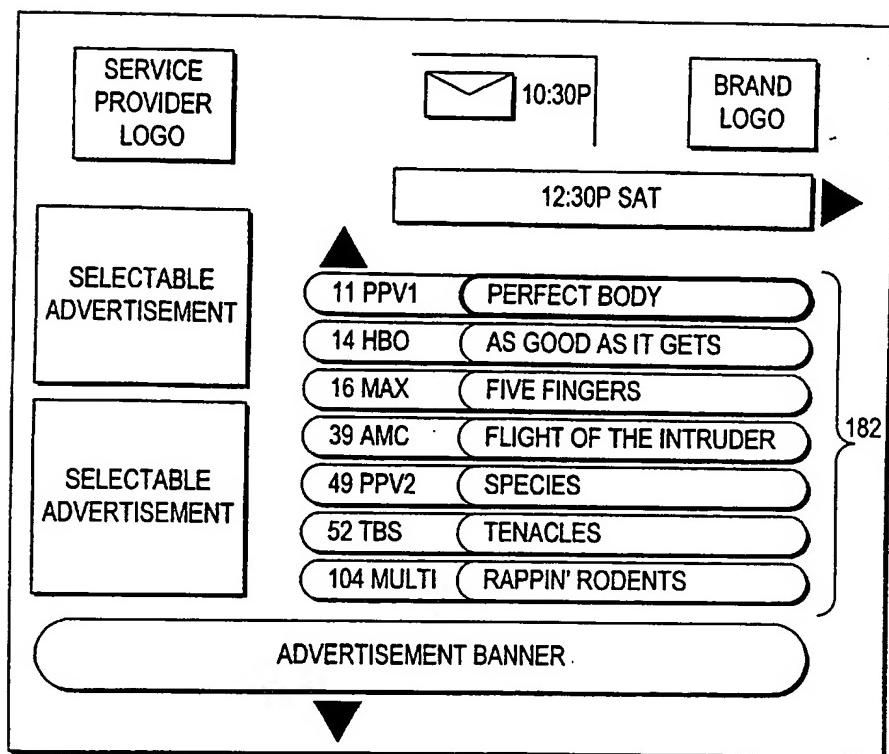
180

FIG. 7

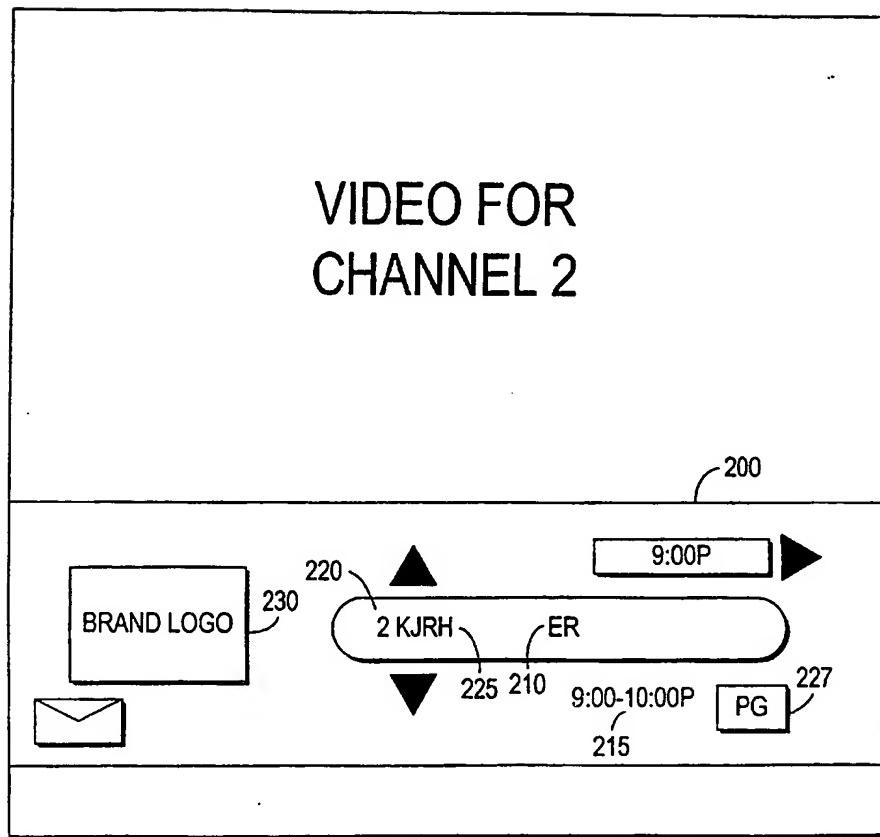


FIG. 8a

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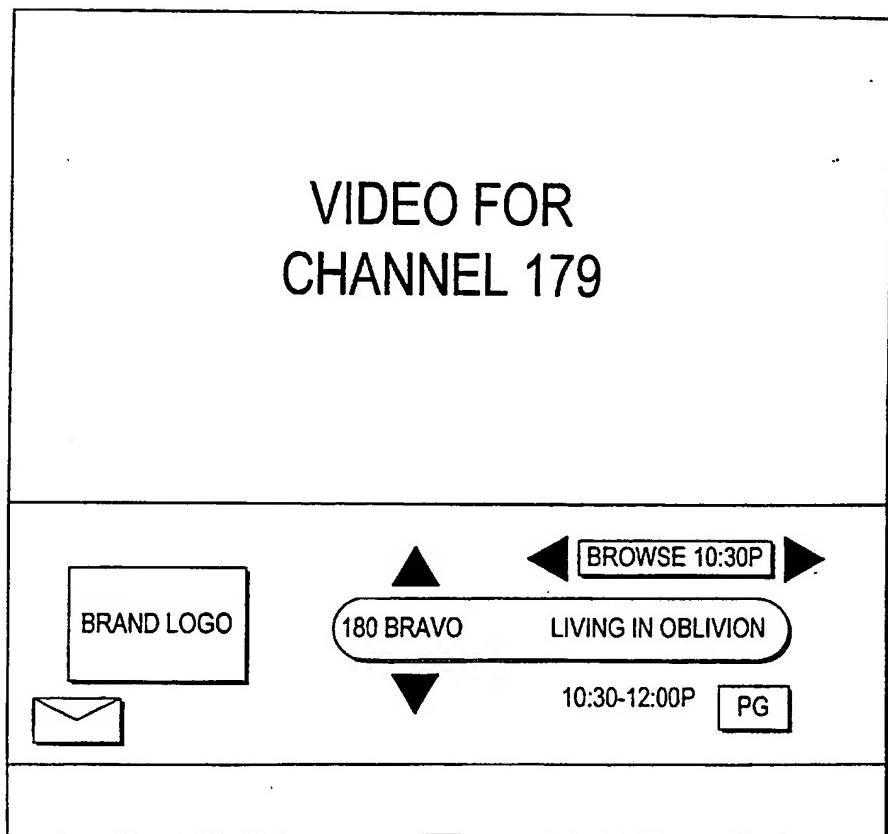


FIG. 8b

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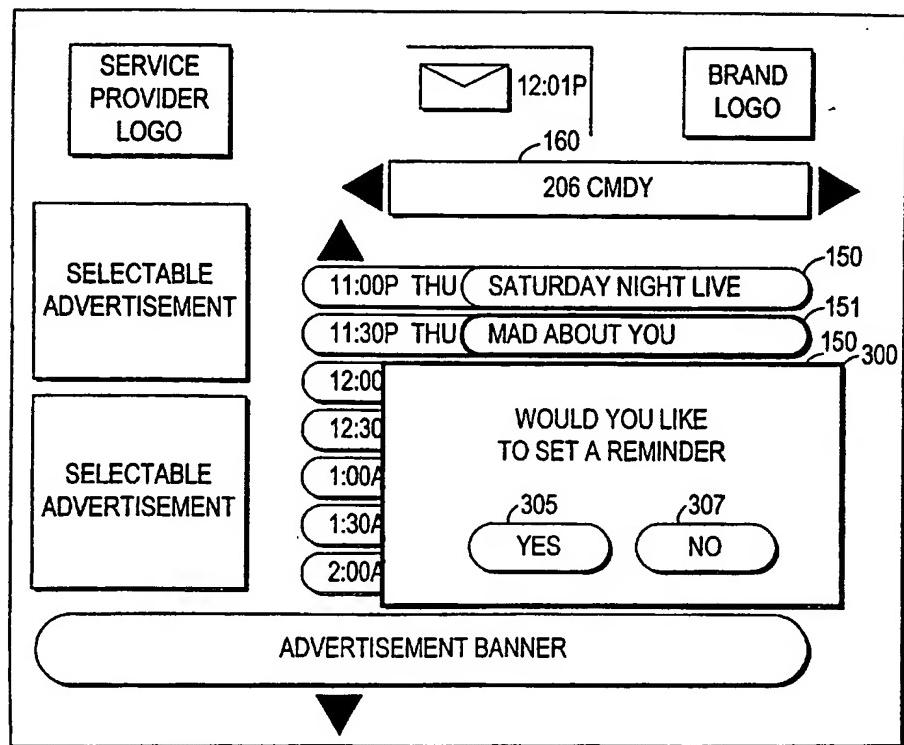
300

FIG. 9a

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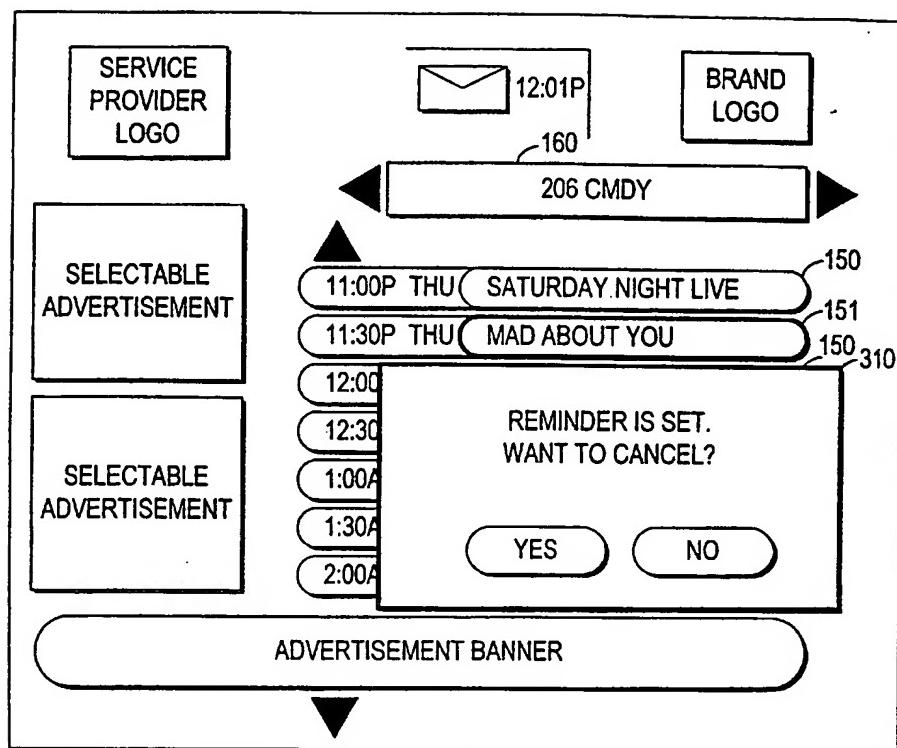
310

FIG. 9b

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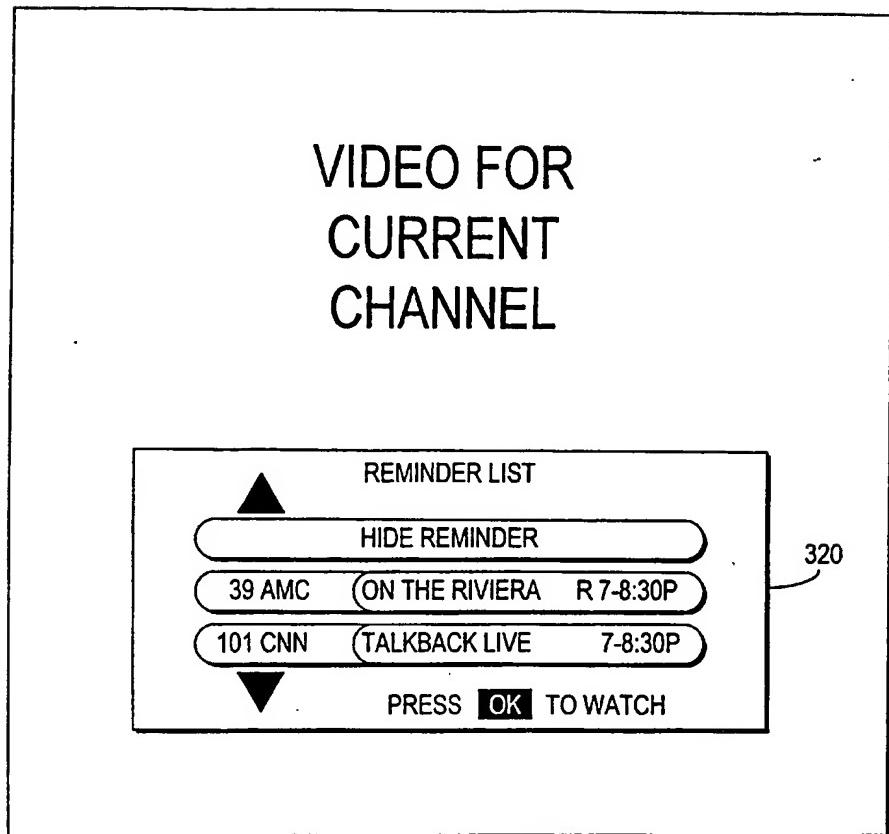


FIG. 10a

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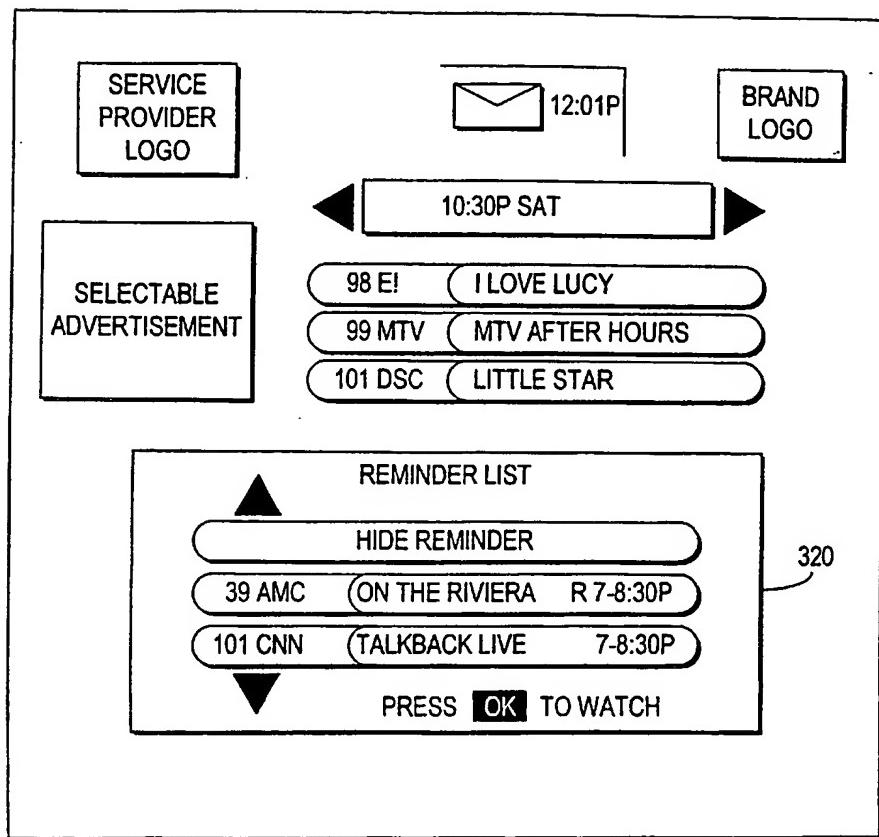


FIG. 10b

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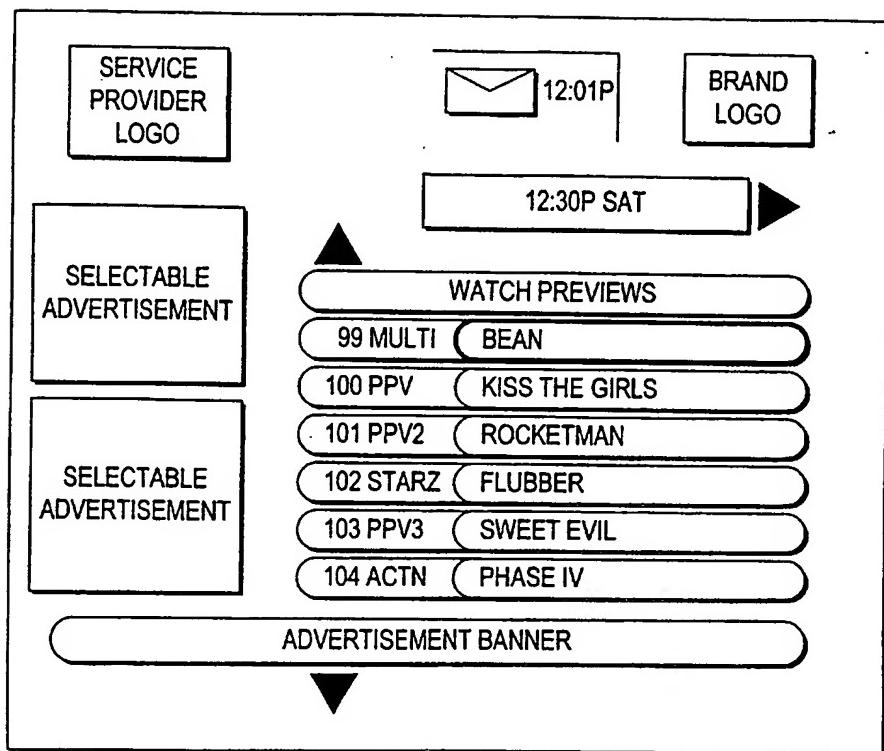
350

FIG. 11a

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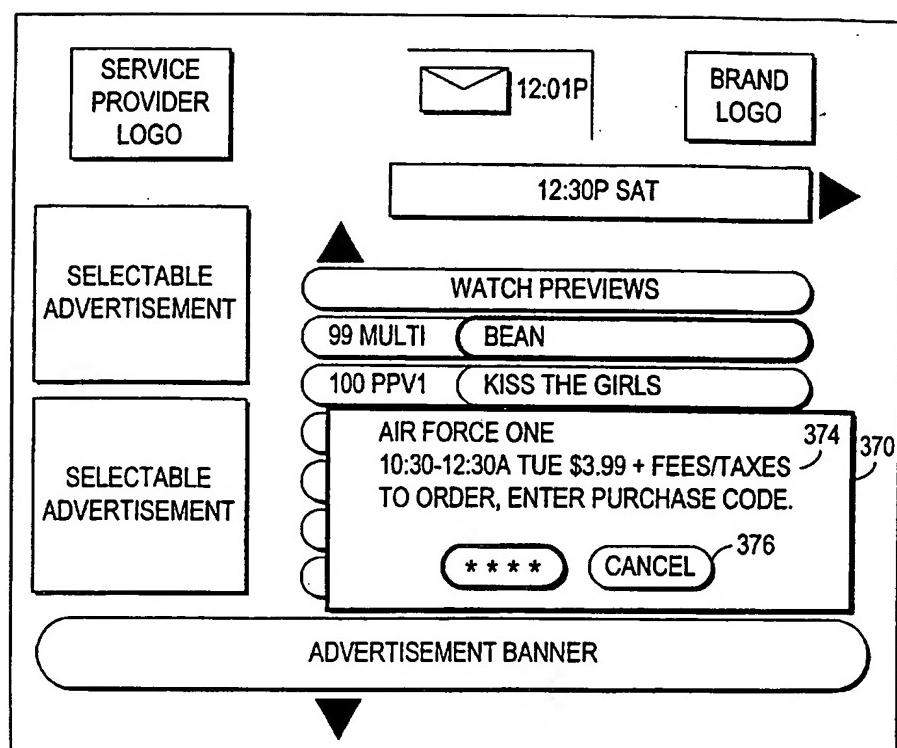
370

FIG. 11b

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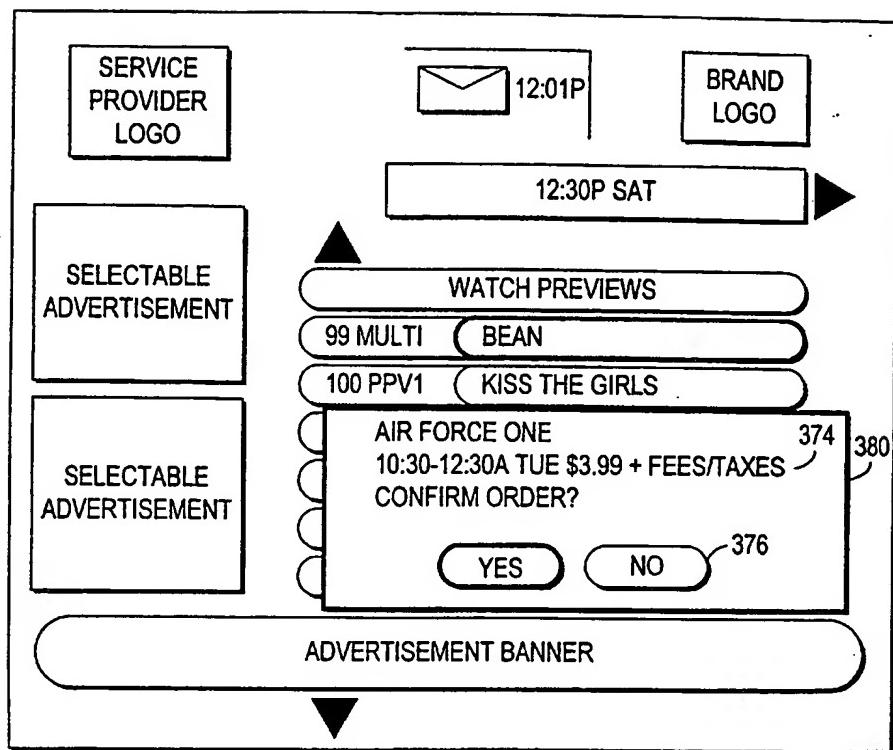
380

FIG. 11c

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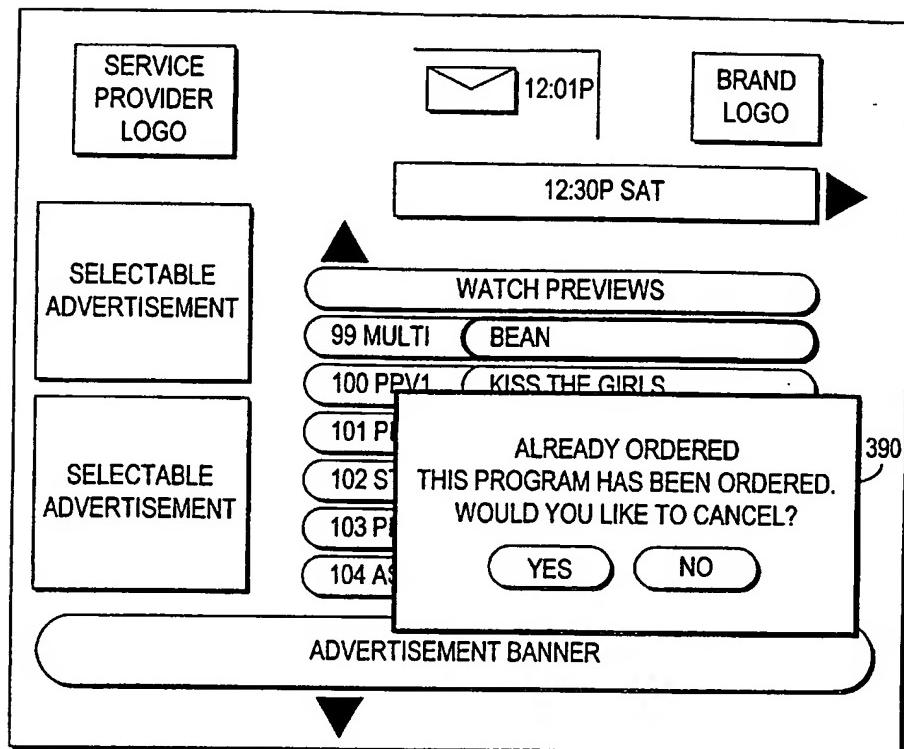


FIG. 11d

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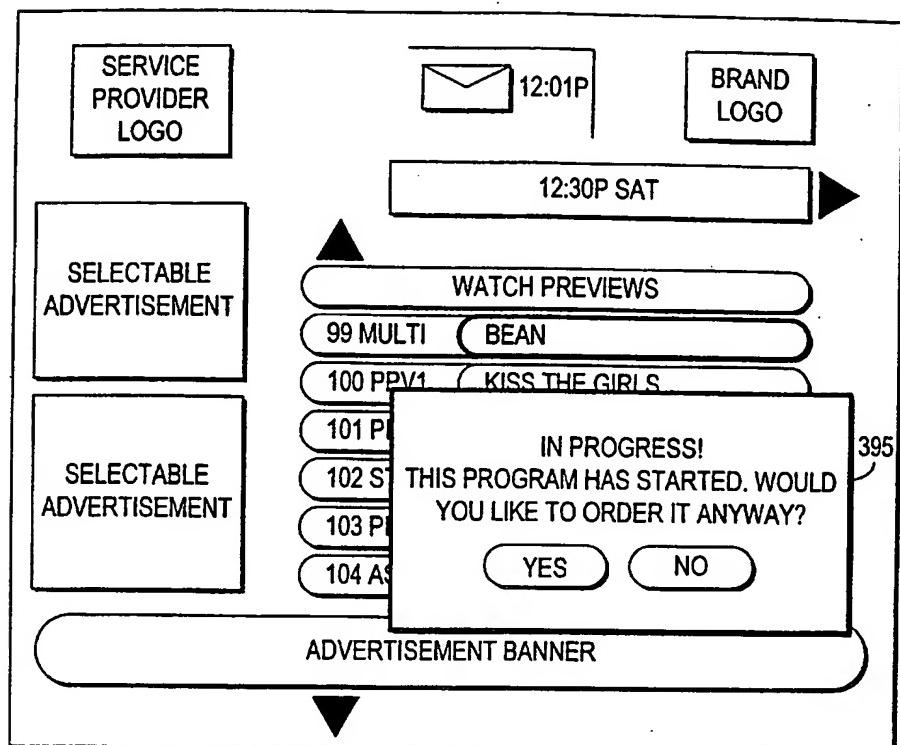


FIG. 11e

20/32

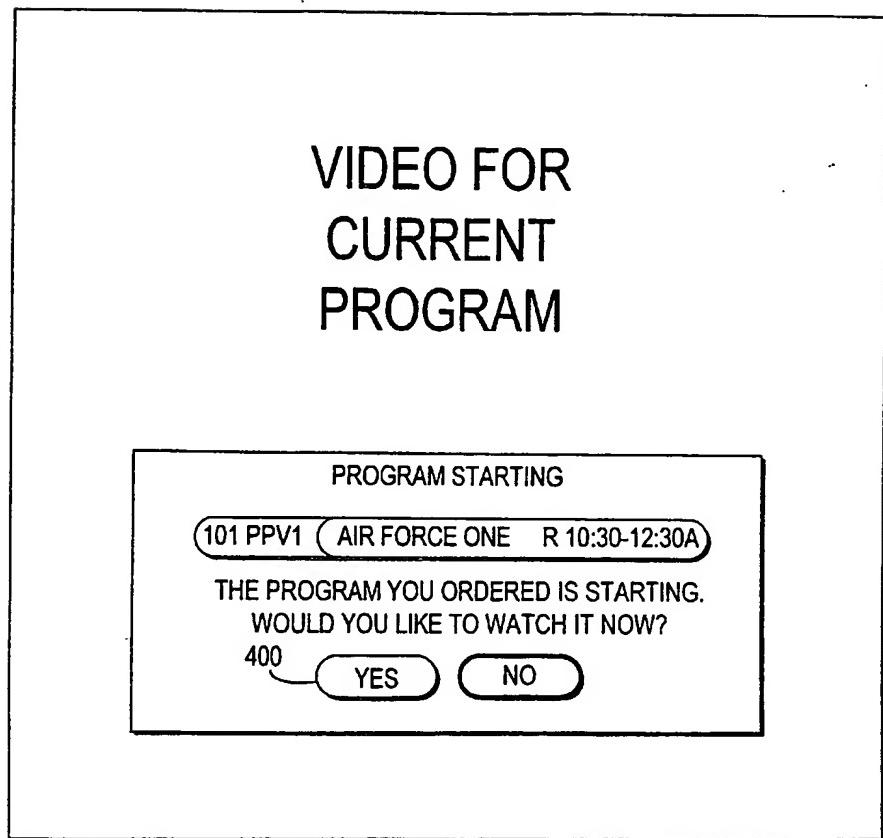


FIG. 12a

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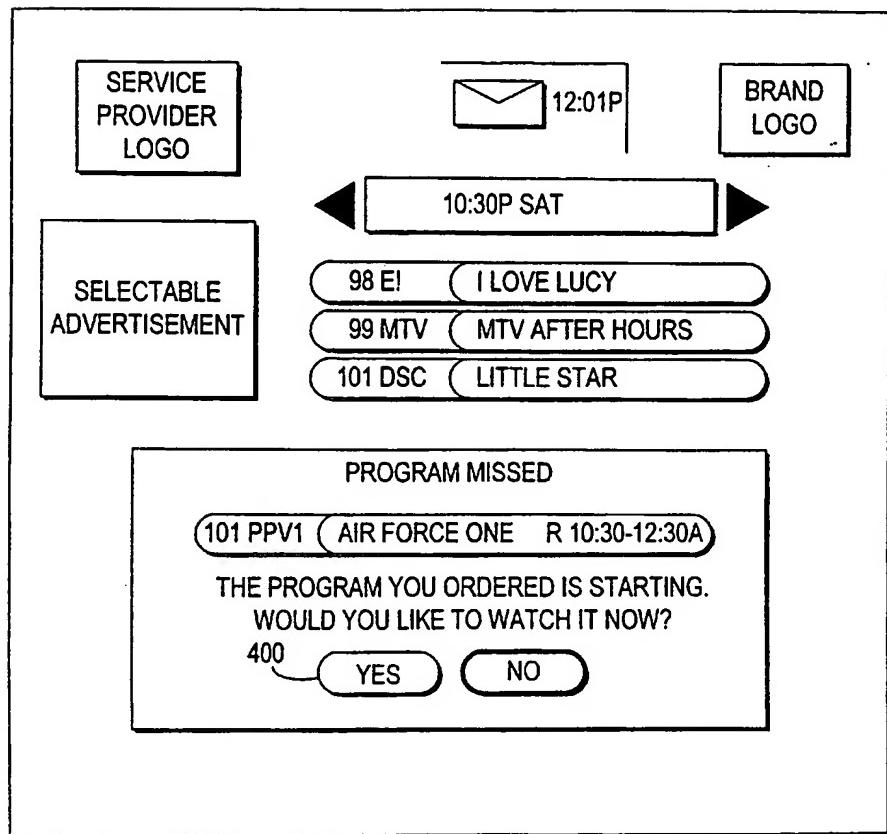


FIG. 12b

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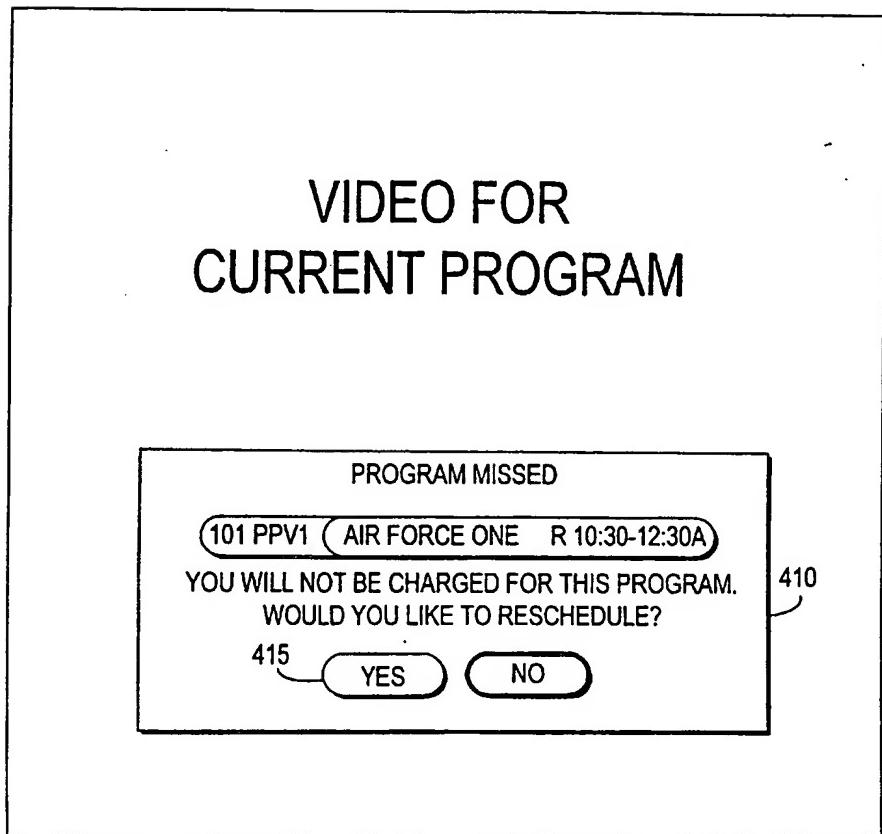


FIG. 13a

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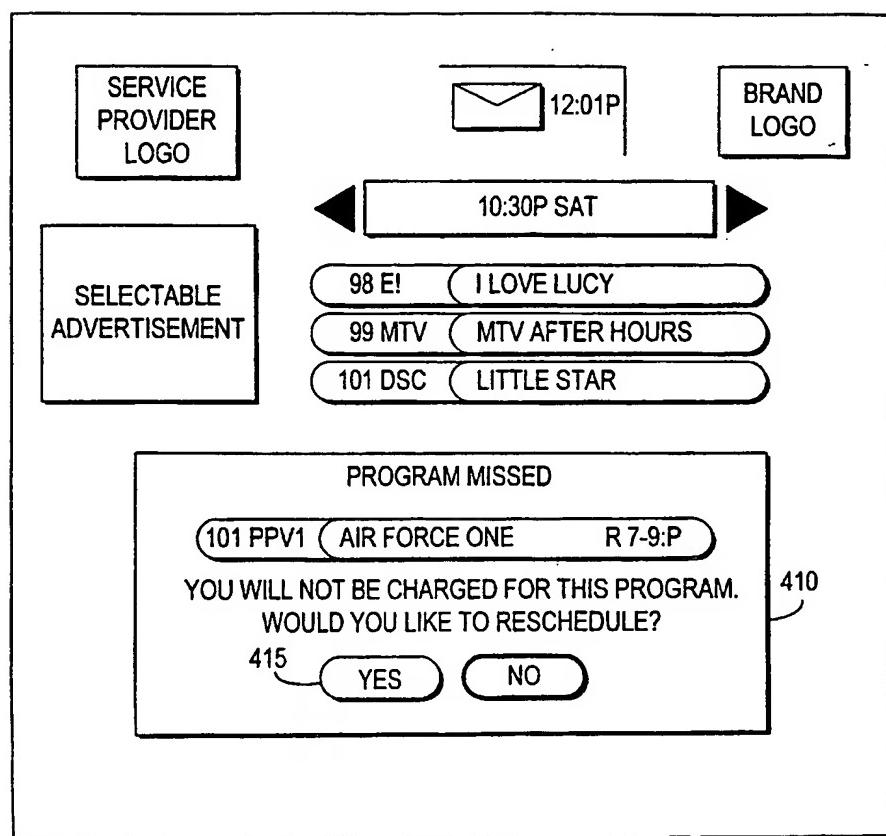


FIG. 13b

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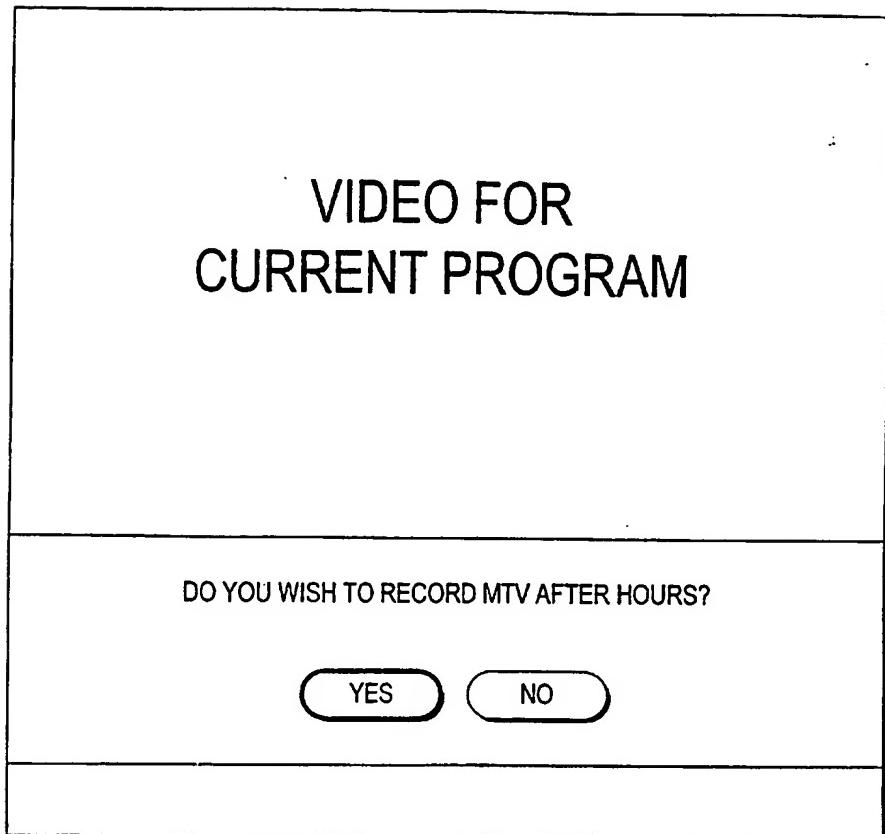


FIG. 14a

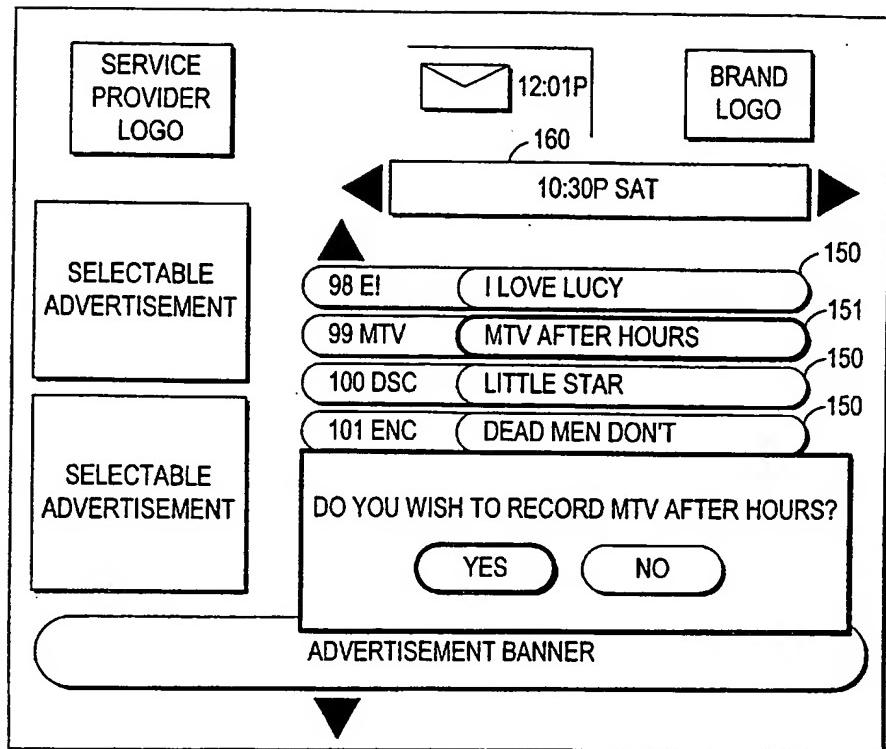


FIG. 14b

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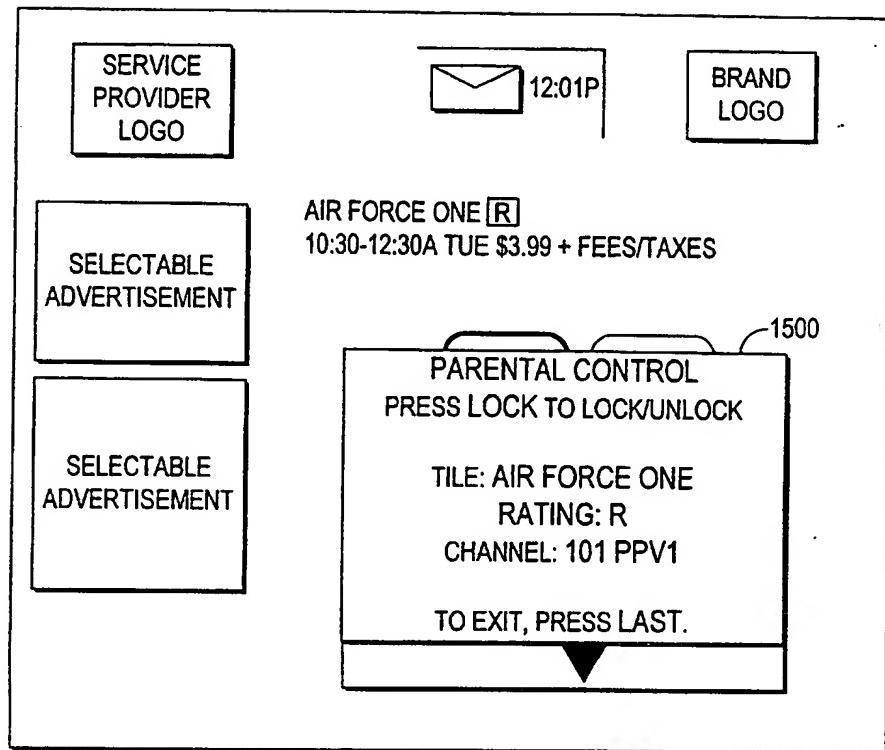


FIG. 15a

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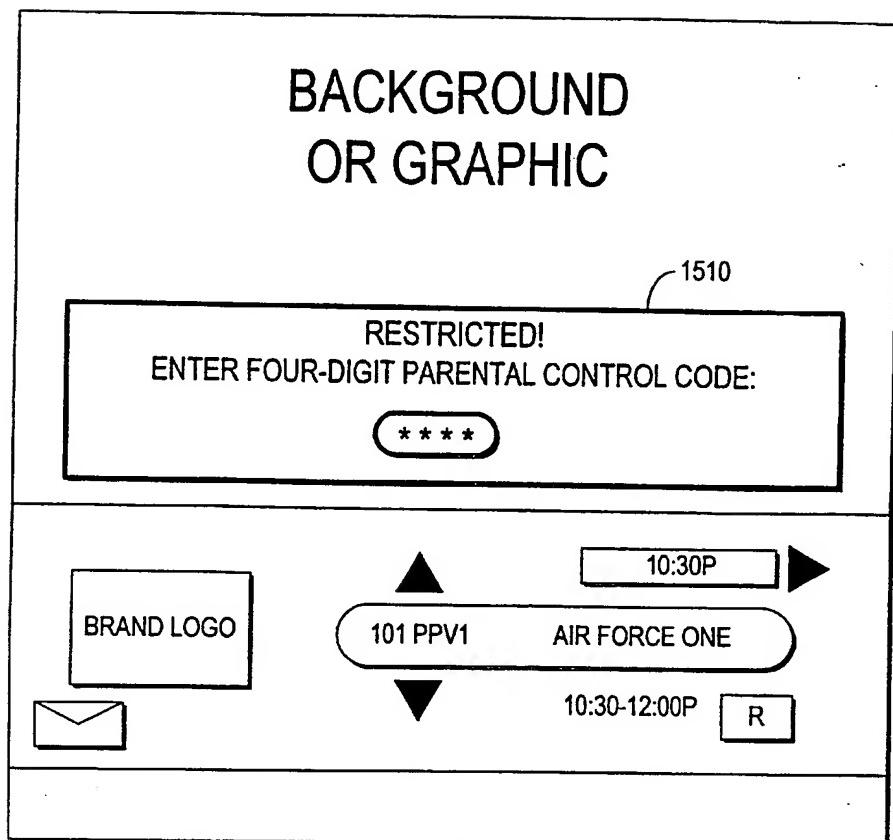


FIG. 15b

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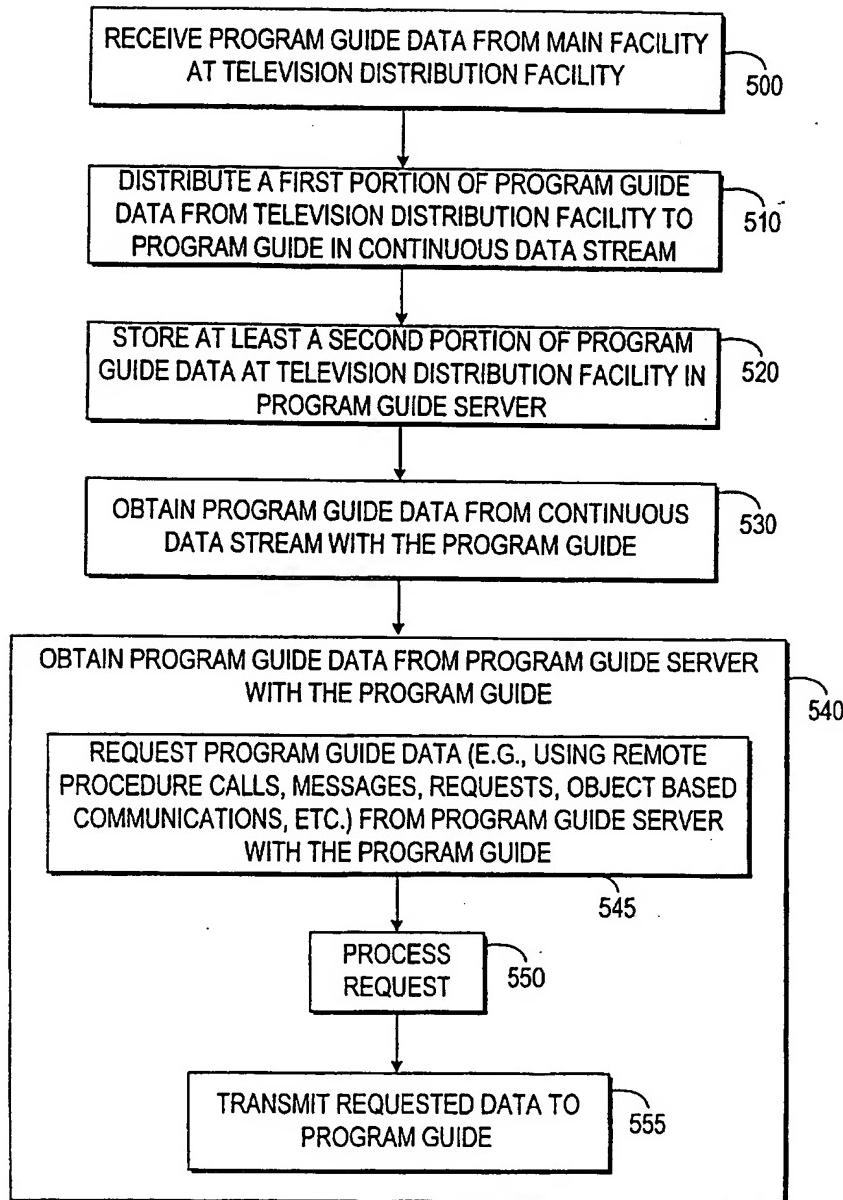


FIG. 16

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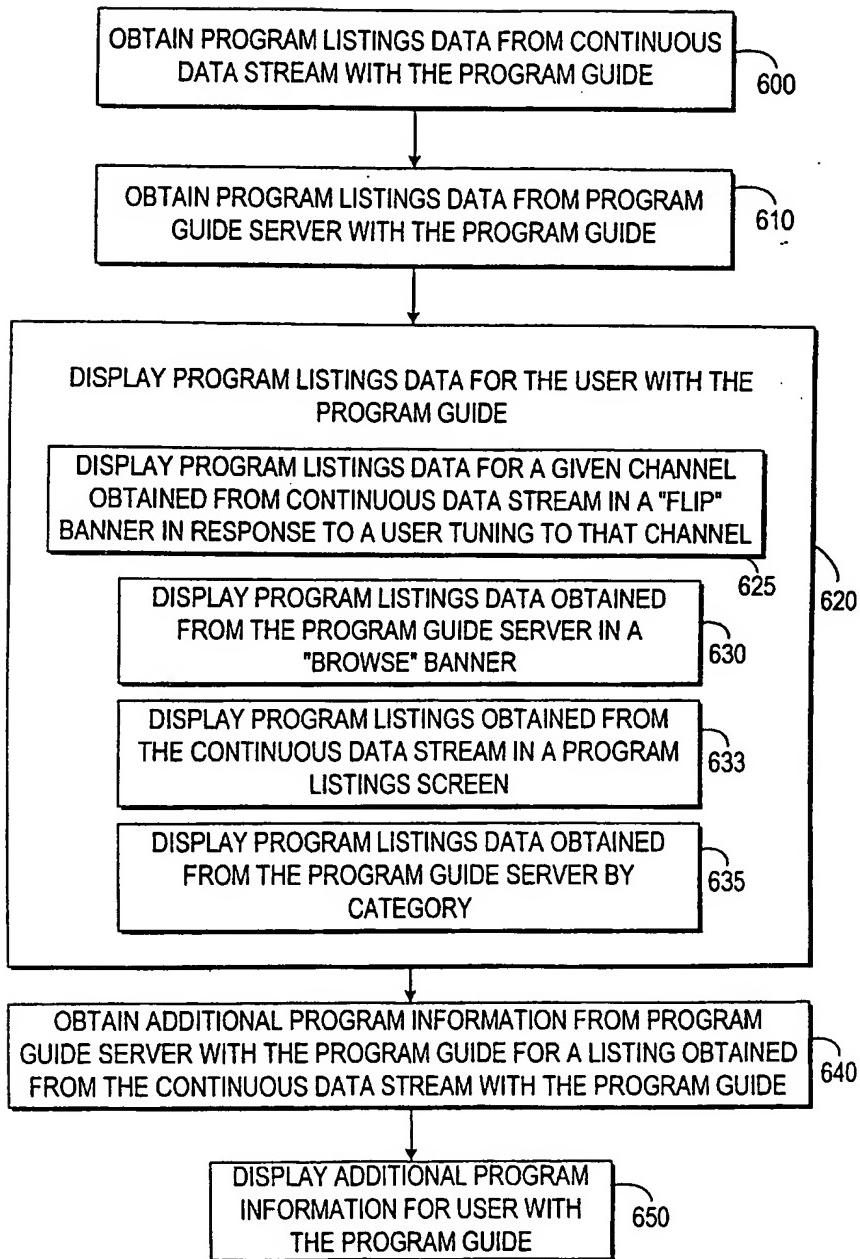


FIG. 17

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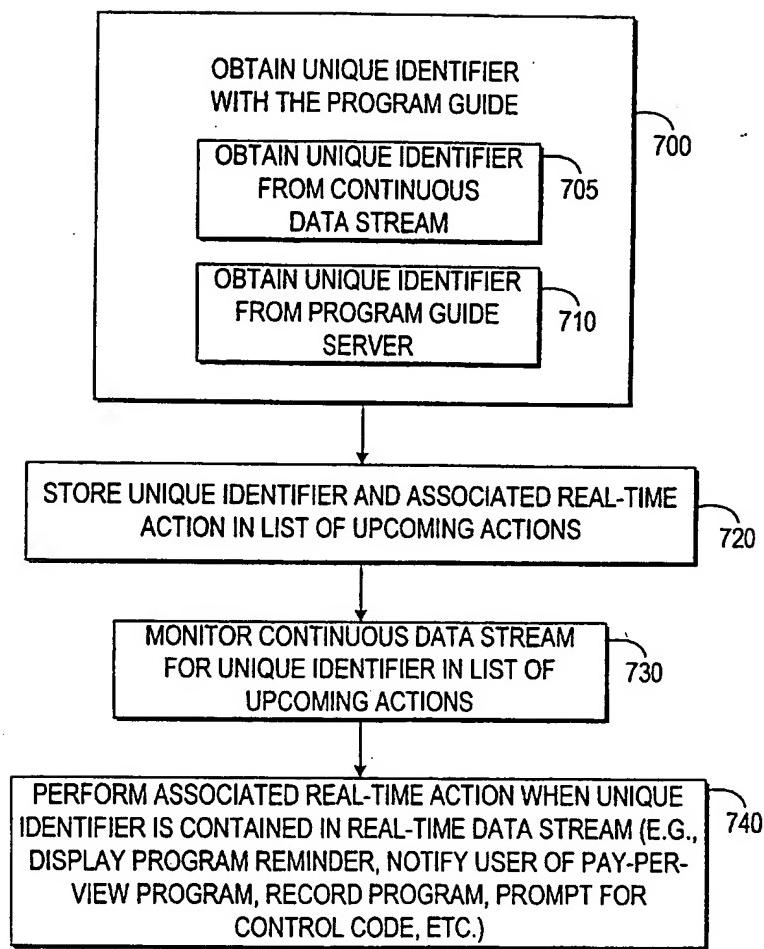


FIG. 18

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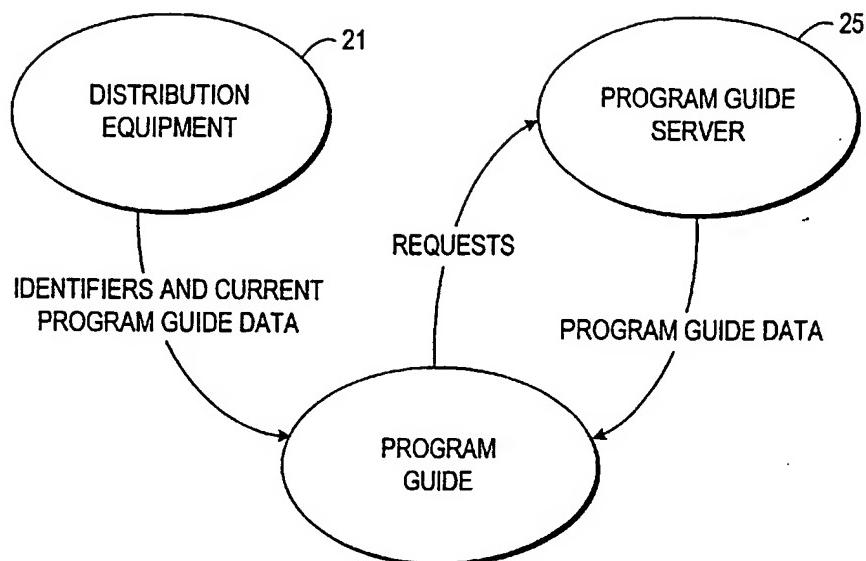


FIG. 19a

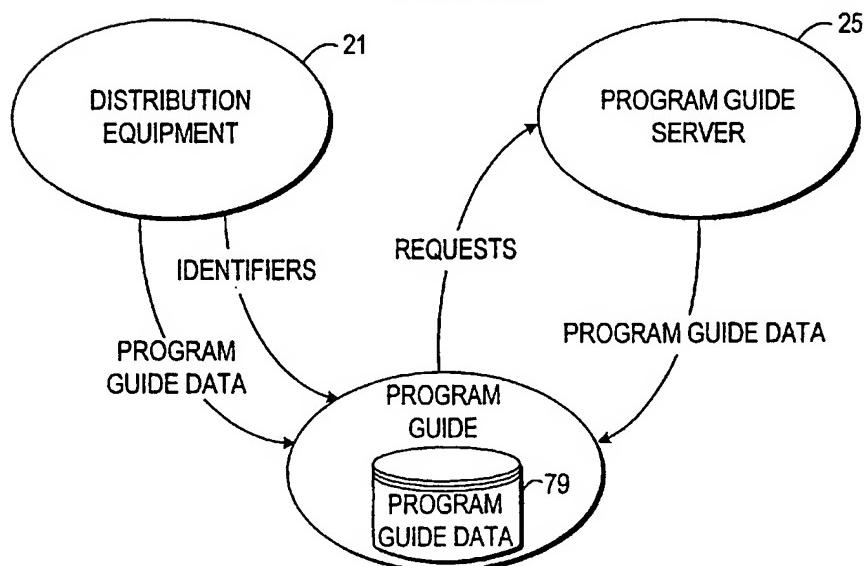


FIG. 19b

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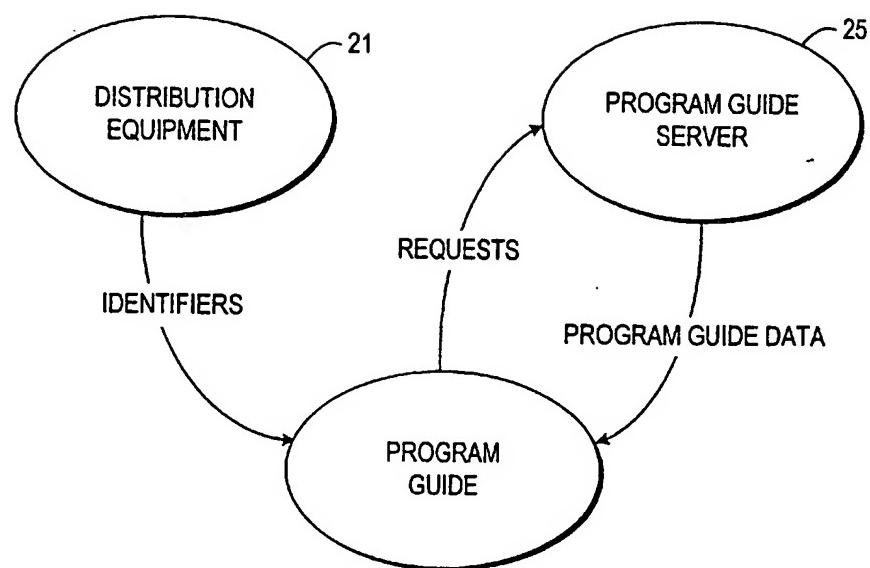


FIG. 19c

**INTERNATIONAL SEARCH REPORT**

Int'l Search Application No  
PCT/US 99/25485

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H04N7/173 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Y	page 4 -page 9	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

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- "E" earlier document but published on or after the International filing date
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the International search  10 March 2000	Date of mailing of the International search report  17/03/2000
Name and mailing address of the ISA  European Patent Office, P.B. 5818 Patentkant 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 851 epo nl, Fax. (+31-70) 340-3018	Authorized officer  Yvonnet, J

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	Int'l. and Application No PCT/US 99/25485
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	page 14, line 23 -page 17, line 7 page 19, line 8 -page 24, line 11; figures 4,8,9	113-125, 135,140, 141, 152-164
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Y	the whole document	
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A	US 5 654 748 A (MATTHEWS III JOSEPH H) 5 August 1997 (1997-08-05)	
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International Application No.  
PCT/US 99/25485

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